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AMERICAN JOURNAL OF PHARMACY.

PUBLISHED BY AUTHORITY OF THE
PHILADELPHIA COLLEGE OF PHARMACY.

EDITED BY

JOHN M. MAISCH.
California College of Pharmacy

PUBLISHING COMMITTEE FOR 1887:

HENRY N. RITTENHOUSE,
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AND THE EDITOR.

VOLUME LIX.

FOURTH SERIES, VOLUME XVII.

PHILADELPHIA :

1887.



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44 GERRARD ST. E.
TORONTO,

THE AMERICAN
JOURNAL OF PHARMACY.

JANUARY, 1887.

ON THE USE OF MAYER'S REAGENT IN THE ESTIMATION OF ALKALOIDS.

BY A. B. LYONS, M.D.

Experimental researches, the details of which were published in the December number of the JOURNAL, justified the following general conclusions :

1. Results of titrations with Mayer's reagent are influenced by various conditions to such an extent that their indications have at best only an approximate value.

2. In dilute solutions the results of titration are always high, not low. Either a stated correction must be made, or a second experiment carried out in which the solution is brought to a standard strength, say of 1:200 or 1:300.

3. The influence of alcohol and of iodides (the same is true to a certain extent also of bromides and chlorides) is to interfere with the precipitation, and yet the effect of their presence may be beneficial rather than otherwise, the end of the reaction being more sharply defined with them than without. This is especially true where a modified reagent is employed, containing an excess of potassium iodide. Such a reagent gives more uniform results with certain alkaloids than the usual solution, but with many alkaloids is not to be preferred, and is not to be recommended for general use.

The object of the present paper is to record some further observations bearing on the question, how Mayer's solution may be most advantageously employed. That it is capable of yielding useful practical results is conceded even by those who criticise it most unsparingly.

The mode of conducting a titration must have an important influence on the result. Some direct to allow the precipitate to subside after each addition of reagent, and test a drop of the clear supernatant fluid with a drop of the reagent. A more common practice, and that which I have adopted in most of my experiments, is to filter the fluid after each successive addition of reagent, using the same filter, which must be only large enough conveniently to hold the whole of the fluid. The titration is concluded when the addition to the filtered fluid—having a volume of 10 cc.—of two drops of reagent fails to produce a permanent turbidity. In some cases the reagent as it drops into the fluid produces a transient turbidity, clearing up at once, while addition of a larger quantity of the reagent produces a permanent precipitate. The formation of this precipitate being obviously conditioned by the presence of a large excess of reagent, it is proper to ignore it.

No doubt the results of a titration will coincide more nearly with what theory requires if a considerable length of time is allowed to elapse after each addition of reagent, but this manner of conducting the operation robs it of its single advantage—rapidity of execution—and is not to be recommended, since, after all, there will be considerable and often quite capricious departures from theoretical figures.

The method, however, of carrying out titrations with Mayer's reagent that has been recently recommended by Frank S. Hereth¹ secures the advantages of the plan just mentioned without extending the time actually consumed in the operation. The method is as follows: Knowing approximately the alkaloidal strength of the solution to be examined, provide half a dozen or more test tubes or vials, and into each measure 10 cc. of the solution. To the first add a quantity of reagent a little less than that likely to be required; to the second a somewhat larger quantity, and so on. Let the test tubes stand at least eight hours, then test a portion of the clear fluid from each with a drop of Mayer's reagent. The first one which fails to react obviously has received a quantity of reagent a little more than sufficient for the precipitation, and it will not be difficult to judge by the amount of cloudiness produced in it just what excess of reagent is present. Of course the value of the titration equivalent will have to be determined anew experimentally, if this method is to be adopted.

¹ *Pharmaceutical Record*, July 1, 1886.

Hitherto Mayer's reagent has been employed almost exclusively in the volumetric method. May we not hope to find it more satisfactory to weigh the precipitates produced, and so ascertain the quantity of alkaloid present? That depends of course on the constancy of composition of the precipitates produced. In my experiments I have given attention to this point also. I find that most of the precipitates vary considerably in weight under varying conditions. The weight of the precipitate often increases materially if it is allowed to stand some hours before collecting.

I have tabulated below some of the results of these experiments. In most cases the precipitates were collected shortly after they were formed, on a pair of mutually counterpoised filters, washed slightly with water, pressed strongly between folds of blotting paper, dried at 100° C. and weighed. Some of the precipitates bear washing fairly well. Most of them begin to dissolve as soon as excess of Mayer's reagent is no longer present. If the washing is continued, a precipitate begins to form in the washings, showing that the water is carrying through some of the alkaloid, the precipitate being either decomposed or dissolved. By using moderately dilute solutions, however, and washing the filters rather than the precipitate, results were obtained which are believed to be reasonably near the truth.

The precipitates were analyzed in the following manner: They were dissolved in alcohol, ammonium sulphide was added in slight excess, and the mercuric sulphide was collected, dried and weighed. The solution was then treated with a drop or two of solution of ferric sulphate to precipitate the excess of sulphur, filtered, and the iodine estimated volumetrically with silver nitrate. In a few instances the silver iodide was also collected and weighed, the result generally coinciding with that obtained by titration, although in some cases it seemed probable from the discrepancy in weight that the precipitate contained chlorine as well as iodine.

It is expected that the color of the precipitate of mercuric sulphide will be black when an excess of reagent has been employed to produce it. In all but one of my experiments such was the fact; in the exceptional instance, the precipitate remained persistently red, a bright brick-red, like native cinnabar. Which of the alkaloids it was that gave this anomalous reaction, I cannot now remember, but there is a suggestion in the observation of a possible new method of preparing vermilion.

The following table gives the results of the experiments made with reference to the composition of the precipitate:

Name of alkaloid.	Weight of Prec. containing 100. alkaloid. ¹	Average weight of alkaloid in 100. of prec. ² approx.	Weight of prec. analyzed.	Hg. in prec. analyzed.	Atoms Hg.	I. in prec. analyzed.	Atoms I.	Molecular weight of prec. ³
Aconitine	179-188	54.8	182.5	27.5	0.73	55	2.35	954-1002
Atropine	216-245	54.4	220	51	0.73	69	1.6	621-708
Berberine	200 ³	55.0		25 ²	0.42	75 ³	2.0	670 ³
Brucine	190-214	48.9	205	30	0.59	75	2.33	749-843
Cinchonidine	348-370	28.5	352	60 ³	0.92	192	4.65	1072-1140
Cinchonine	324-348	30.0	339	62.5	0.96	176.5	4.23	988-1072
Cocaine	240-270	40.7	246	50	0.76	94	2.25	
Colchicine	155-180		159	34	0.58	25?	7.4	491-671
Emetine	240-256	40.8	245	44	1.09	105	4.10	1190-1270
Gelsemine	185-200	52.4		50 ³	1.02	50 ³	1.61	816 ³
Hydrastine	200-210	47.6	210	37	0.73	73	2.28	834 ³
Hyoscyamine	222-250	43.5	228	46	0.66	82	1.87	642-737
Morphine	190-204	48.6	202	42	0.60	60	1.55	541-582
Pilocarpine	298-340		308	81	0.84	127?	2.08 ⁴	614-707
Quinine	310-335	30.8	325	64	1.04	161	4.11	1004-1085
Strychnine	258-274	37.9	264	57	0.95	107	2.81	860-913

What I desire to show by these tabulated results is that, making all allowance for such deviation from the normal composition as we may look for in complex compounds formed under such circumstances as those of my experiments, a few only of the precipitates approximate a composition corresponding with the formulæ assigned them by Prof. Mayer. From the data here presented, it would appear that in the case of the cinchona alkaloids, emetine, gelsemine (?) and strychnine, the precipitate contains one atom of mercury for each alkaloidal molecular group. For the cinchona alkaloids and emetine, at least, the normal formula is probably $R'I_2.HgI_2$, R representing the alkaloidal radical. There is some uncertainty about the record I have of the single experiment made with gelsemine. If there is not some mistake in the recorded figures, the composition of the precipitate is quite anomalous, but the formula of gelsemine cannot be considered to be as yet positively fixed.⁵

¹ The higher figures in this column were generally obtained only when the precipitate was left some hours before filtering.

² Precipitate collected soon after it is formed.

³ Assuming that it contains one equivalent of alkaloid.

⁴ The precipitate seems to contain Cl as well as I.

⁵ My associate in analytical work, Mr. F. A. Thompson, is making a new study of the alkaloids of gelsemium, which will shortly be published.

In general, it appears that the formulas must be less simple than is commonly represented, and they show a smaller proportion of both mercury and iodine than one should expect, unless we abandon the theory that the compounds are double iodides. [It will be remembered that ammonia is precipitated (in alkaline solutions only) as a compound of quite a different constitution, the formula of which is $\text{Hg}_4\text{N}_2\text{I}_2 \cdot 2\text{H}_2\text{O}$.] In several instances the proportion of iodine is but little more than sufficient to satisfy the demands of the dyad mercury alone.

The question of vital consequence is whether precipitates produced by Mayer's reagent are of so constant a composition as to be available for purposes of gravimetric estimations. With a few exceptions, I believe that where approximate results only are contemplated, they are thus available. When they are to be used in this way, they must be produced by adding at once sufficient reagent to precipitate the alkaloid completely, with a small margin of excess. The precipitate must be allowed to stand several hours before it is collected. It will not bear much washing. Sometimes it will adhere firmly to the beaker. When this is the case it may be washed once or twice superficially with water, dried in the beaker and weighed. Otherwise it can be best collected on a pair of mutually counterpoised filters, washed with a little water, so applied as to wash the filters rather than the precipitate, pressed between folds of filter paper, dried at 100°C ., and weighed. It is evident that a precipitate thrown down in a solution heavily loaded with foreign substances, such as that obtained from a fluid extract, cannot be advantageously used in this mode of estimation, since the precipitate would carry down mechanically too much foreign matter, which we cannot wash out without material loss of the substance of our precipitate. It is therefore advisable in such a case to separate the alkaloid, in a crude form at least, in the first instance, dissolve it in a little acid, make up to a suitable volume—the solution should not contain more than 1:200 of the alkaloid—and precipitate from this prepared solution.

Further experiments are necessary to ascertain exactly what, under the conditions here prescribed, will be the average weight of the precipitates produced.

The principal reason why the results of titrations made under varying conditions show such large differences, is that there is always required to complete the precipitation of the alkaloid a notable excess

of reagent. The quantity of mercury which combines with the alkaloid, although not perhaps absolutely constant, does not show any wide range of variation, particularly when the conditions of the precipitation are similar. Some simple mode of estimating the excess of reagent present at the end of the titration—or, better, after several hours have elapsed—is therefore obviously a desideratum. Prof. Mayer's plan of titrating the excess with decinormal silver nitrate—apart from other considerations—ignored the circumstance that the reagent contains an excess of iodine over and above what takes part in the reaction and that it also contains chlorine. Besides, the alkaloids requiring titration are not unfrequently in the form of chlorides. In order to obtain any useful results by Prof. Mayer's method, a complicated mathematical calculation is required, of which the data themselves cannot be assumed *a priori* to be known.

Observing that the precipitate produced by silver nitrate in a fluid containing Mayer's reagent was at first bright chrome yellow, while, on continued addition of the silver solution, the successive portions of precipitate passed from a bright to a pale yellow color, it occurred to me that it might be, after all, possible to estimate the excess of mercury by this means, assuming that the bright yellow compound is a double iodide containing mercury. It appears, however, that this compound is not formed exclusively at the beginning of the reaction, and the color fades so gradually that no exact conclusions could be drawn from the indications presented, although they serve as a rough measure of the amount of the excess.

Incidentally, I desire to call attention to the existence of the bright yellow compound in question which I regret that I have not had time to study. It is remarkable that it is not at all sensitive to light. Its composition and properties are worthy of investigation.

Finding that strychnine was precipitated more perfectly than almost any other alkaloid, and with less variation under different conditions, I thought it might be practicable to estimate the excess of reagent in a solution by the use of this alkaloid, and the plan is one that proves measurably successful. After finishing the titration in the ordinary way, add to the filtered fluid one, two or three cc. of a solution of strychnine of a strength corresponding exactly with that of the Mayer's reagent used. Filter and titrate the excess of strychnine with Mayer's reagent, and by deducting the quantity used of the latter from the amount of strychnine solution added, the required excess is obtained.

The practical objection to this procedure is that it requires the operator to provide a standard solution of strychnine,¹ which will take some extra time and labor to prepare, and which will, perhaps, change with time, necessitating frequent re-examination after it is prepared. For the pharmacist I certainly should not recommend the method, while the professional chemist will object that it is lacking in precision.

In my former experiments upon the pure alkaloids, I estimated excess by a very simple colorimetric method, as follows: I diluted 1 cc. of the Mayer's reagent N 1:20 to 200 cc. with distilled water, placed 10 cc. of the dilute fluid in a tube of white glass, added a small drop of ammonium sulphide, and then diluted portions of the filtered fluid in which I wished to estimate excess, until 10 cc. treated in a similar manner gave a fluid of the same shade of color, a pale golden brown. Suppose the whole volume of fluid at the close of the titration were 12 cc. A portion of this fluid, diluted with $4\frac{1}{2}$ times its volume of water, gives a color identical with that of my standard. Then, $12 \times 4\frac{1}{2} \div 200 = 0.27$ will be the excess sought.

It will be seen at once that this plan is applicable only in titrations of colorless, or nearly colorless fluids. I have at present no further suggestion to offer in this direction, but there should be no difficulty in devising some simple plan for making this estimation of excess volumetrically.

The work I have done, it will be readily seen, is after all of a preliminary character. In some of it I have doubtless been anticipated by others, whose results I have not been fortunate enough to have met with. I trust, however, that on the foundation that is afforded by the body of observations to which these hereinbefore recorded are a contribution, there will ultimately be built structures of analytical methods that will be able to withstand all storms of adverse criticism.

DETROIT, MICH., Nov. 16, 1886.

Poisoning from sorrel.—A fatal case of poisoning is reported in *Hospital Gazette*, June 19, 1886. A boy five years of age ate a quantity of fresh sorrel, *Rumex Acetosa*, *Lin.*, and subsequently to quench the thirst drank of soapy water within his reach. The decomposition of the soap by the acid oxalate of the sorrel resulted in the production of a freely soluble salt by the absorption of which the fatal event was hastened.

¹The strychnine solution, to correspond with a reagent N 1-20 should contain in each cc about 8.5 mg. strychnine.

SYNTHETICAL OIL OF GAULTHERIA.

BY CHARLES BULLOCK.

Read at the Pharmaceutical Meeting, December 21.

In 1842 William Procter, Jr., published in the *AMERICAN JOURNAL OF PHARMACY*, "Observations on the volatile oil of *Gaultheria procumbens*"—proving it to be a hydraeid similar to salicylic acid.¹

Subsequently M. Cahours made an ultimate analysis of the oil and showed that it had the same composition as salicylate of methylene.

There has now been introduced into commerce a synthetical oil of gaultheria. This oil is colorless, has a specific gravity of 1.176 and boils at 398° F.

The odor of the oil closely resembles that obtained from the plant; when agitated with water the same reaction is afforded on addition of chloride of iron as is given by the natural oil. It may be distinguished from the natural oil by agitating a few drops with water in a tube, a tinted mixture is formed from which the oil does not separate for some time; the oil from the plant when agitated with water separates almost immediately in clear drops. The artificial oil contains a small amount of what appears to be methyl ether, which tends to suspend the oil in water; repeated washing removes most of this product, after which the oil settles more quickly.

Some experiments were made by Mr. Geo. M. Berringer on the manufacture of the oil, using the following formula:

Salicylic acid, $\frac{1}{2}$ oz.

Methylic alcohol, absolute, 2 fl oz.

Sulphuric acid, 1 fl oz.

Dissolve the salicylic acid in the alcohol, then add gradually the sulphuric acid; warm gently during 24 hours; then distill from a retort into which a current of steam is introduced.

The distillate is to be well washed and separated by decantation. The odor of the product improves by keeping.

¹Vol. xiv, p. 211.

Piper Betle, Lin.—The volatile oil of the leaves was found by Schmitz to be a good antiseptic and useful in catarrhal complaints. Dr. Kleinstück of Jena has obtained similar results. The volatile oil appears to contain an aldehyde, and is stated to rapidly oxidize on exposure and to lose its characteristic odor and its therapeutic properties.

SUBIODIDE OF BISMUTH.

BY JOSEPH W. ENGLAND, PH. G.

Read at the Pharmaceutical Meeting, December 21.

Some ten years ago, Dr. A. Sidney Reynolds, of this city, through Mr. R. F. Fairthorne, a graduate of this College, introduced into hospital practice the use of bismuth subiodide (or more correctly, oxyiodide), in the local treatment of chronic ulcers, syphilitic sores, eruptions, etc., etc., and found it to be a most efficient remedial application, more effective than iodoform, with none of the "saffron-like and almost insuppressible odor," so characteristic of that latter antiseptic. It was employed to a limited extent, but its high cost militated effectually against its more general adoption.

Recently, Dr. Reynolds has published¹ the results of his experiments for the past ten years and expressed, most fully, the applicability of this chemical as a dressing and as a perfect substitute for iodoform, calomel, bismuth subnitrate and others in vogue. He claims that "it will control inflammation, allay irritation, suppress suppuration, promote granulation and induce cicatrization. It has been found to be almost a specific in gonorrhœa, in various septic and specific mucous inflammations, oral and nasal catarrhs, ophthalmias, etc., in chancre, rectal ulcers, etc., and in the various cachectic and dyscrasic ulcerations. Internally, it is strongly recommended in gastric ulcers, gastritis and in typhoid fever."

It has been freely and extensively used in the venereal, surgical and other departments of the Philadelphia Hospital for the past two or three months, and Dr. E. Matlack, of the resident staff, thus expresses himself upon the results of his experience: "The subiodide of bismuth would seem, in internal medication, to be indicated in all those conditions for which the subnitrate of the same metal is at present employed, and locally, its action can best be compared to that of iodoform, possessing as it does, anæsthetic and sedative properties, but superior to that agent, in that it is not poisonous by absorption, it is free from all odor and it suffices, when a less quantity is used, to cover the same extent of surface." Experiments are now being made by Dr. E. O. Shakespeare, Curator of the pathological department of the same institution, touching its relative germicide value in comparison with that of iodoform and others, the results of which will be announced at a later date.

¹ The subiodide of bismuth in the treatment of ulcerations. *Med. News*, Oct. 9, 1886, p. 303.

It is a matter of interest, that the first general statement concerning this oxysalt was, probably, made by Messrs Woodman and Tidy,¹ who found it in an old mixture of potassium iodide and bismuth subnitrate given, by them, to one of the patients of the London Hospital. They stated that the change took place slowly, with the formation of the soluble potassium nitrate and the insoluble bismuth iodide. This iodide, they isolated, was a fine, brick-red powder, consisting of very small, cubical crystals, almost insoluble, both in water and solution of potassium iodide. Saturated solutions of chloride of ammonium, chloride of sodium, ferrocyanide of potassium and corrosive sublimate, failed to dissolve it in any appreciable quantity. Acetic acid dissolved it, slightly, without effervescence. On boiling it with a solution of potassium or ammonium hydrate, the hydrated oxide of bismuth was produced, which was insoluble in excess of either reagent. On treating the iodide with strong nitric acid, there was strong effervescence, fumes of iodine being given off, with a residue entirely soluble in alcohol and which, upon further examination, proved to be pure iodine. Acid solution of bismuth nitrate remained, which was not precipitated by a small quantity of water or until neutralized. With hydrochloric or sulphuric acid, there was no effervescence, but iodine was again precipitated, and, with the sulphuric acid, some iodic acid was formed. Oxalic acid also decomposed the salt, setting free the iodine; the action being somewhat slower than it was in the case of the mineral acids. A few trials of it, internally, in doses of from 5 to 20 grains, appeared to indicate that it was not an energetic therapeutic agent; which apparent lack of activity was ascribed to its comparative insolubility.

As previously stated, the high cost of this bismuth dressing (\$12 a pound), has effectually prohibited its general employment and the writer was led to make a series of experiments, in the Philadelphia Hospital, concerning its mode of preparation, in order to ascertain whether some method could not be devised, whereby the compound could be much more readily and cheaply made.

The general method, as stated to be at present employed, *i. e.*, solution of bismuth subnitrate in sufficient strong nitric or hydrochloric acid, and precipitation in, or with, potassium iodide solution, is very unsatisfactory in practice, in that the precipitates formed, are of very

¹ *British Med. Jour.*, *vide* *AMER. JOUR. PHARM.*, Feb., 1871. p. 85.

varying chemical composition, if any of the details of preparation are deviated from in the slightest degree.

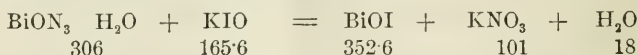
In the first place, if the acid solution of the bismuth salt is too acid and the potassium iodide solution is too strong, iodine is liberated and the product is black, probably, from the formation of the black triiodide (Bi I_3) of Messrs. Fletcher and Cooper.¹ Then, if the acid solution is too weak or the added potassium iodide is too dilute, the great tendency is toward the formation of a large proportion of oxynitrate. Then, if to the strongly acid solution the iodide, in not sufficiently diluted solution, is added the precipitate will be very deep reddish-brown in color, which apparently does not change on standing in cold water, and the variability of whose hue seems, partially at least, to depend upon the acidity of the acid solution and upon the temperature at which the liquids are mixed. Lastly, if the acid solution is made with the correct degree of acidity and is poured into mixed solution of potassium iodide and sodium acetate, the so-called yellow iodide of bismuth is formed; a precipitate whose color varies in shade as obtained by different methods, and whose contained iodine, in quantity, is in direct proportion to the depth of its color. This latter product has been proved¹ to be nothing more than a very basic compound of five molecules of bismuthous oxide ($\text{Bi}_2 \text{O}_3$) and one molecule of bismuth iodide (Bi I_3).

The extreme variability of the products sold as pure bismuth subiodide may be inferred from the fact, that of the several makes which have appeared in the markets, one was of a light-buff yellow color, apparently made as previously mentioned or by trituration, simply, of the oxynitrate with a solution of potassium iodide. Another was very light reddish-yellow in color, evidently made by trituration of the oxynitrate with Lugol's solution of iodine, and consisting of a slightly larger percentage of oxyiodide than the former; and, yet another sample was of the normal brick-red color characterizing the true product.

The first process devised by the author was used for nearly two months, and was based upon the fact that bismuth subnitrate was first decomposed, partially, when triturated with potassium iodide, in aqueous solution, to form small quantities of iodide and oxide of bismuth, then by nascent iodine (in the presence of hot water), liberated through

¹ Year-book of Pharmacy, 1882, p. 472-479.

the gradual addition of dilute nitric acid (U. S. P., '80) all the bismuth salts were converted, first, into the black iodide, and then by the hot water present into the red oxyiodide. If great purity is desired, the addition of hot water could be omitted and the suggestion of Prof. Maisch¹ be employed, namely: that to obtain the oxyiodide pure, the unwashed, dried, precipitated brown (black?) iodide should be dissolved in hydriodic acid or in potassium iodide and precipitated with water. He further stated that the black bismuth iodide can be made by subliming a mixture of iodine and powdered bismuth, whereby black metallic scales of the iodide are obtained, which are permanent in the air, but little affected by cold water and quickly converted by hot water into the red oxyiodide. It may be here mentioned, in connection with the "trituration process," previously described, that the addition of the dilute acid should not be pushed beyond the point where all the bismuth salts are decomposed, because the product becomes darker than its normal color, with the setting free of iodine and the formation of varying quantities of black triiodide, which latter, however, may easily be rechanged to the oxyiodide by treatment of the precipitate with water. The whole reaction, accepting the U. S. P. (1880) formula for bismuth subnitrate, may be summed up as follows:



The following is the formula employed, using four times the molecular weight in grains:

Take of

Bismuth subnitrate, $\bar{3}$ iiss, gr. xxiv.
Water (hot), $f\bar{3}$ viii.
Potassium iodide, $\bar{3}$ xi. gr. iii
Dilute Nitric acid, q. s. or about $f\bar{3}$ vi.

Triturate, in a mortar, the bismuth compound, with the potassium iodide dissolved in the hot water, and then slowly add, with constant trituration, $f\bar{3}$ iv of the dilute acid, and the remainder, drop by drop, until the decomposition is complete. Filter; wash the precipitate thoroughly with warm water until the washings cease to affect blue litmus-paper; dry, and powder. The yield is about three troy ounces, whose cost, counting the ingredients of manufacture at market rates, is inside of \$3.50 a pound (av.) or 25 cents an ounce (av.), instead of \$12 a pound (av.) or 75 cents an ounce (av.).

Concerning the present chemical formula given to subnitrate of bismuth by our present pharmacopœial standard (U. S. P. 1880), there is much to be said in criticism upon it. The Pharm. Germ.¹ says of this bismuth salt, that "when heated to 120°C. (248°F.) it loses between 3 and 5 per cent. of moisture, and at a red heat gives off yellowish-red vapors, and leaves between 79 and 82 per cent. of bismuthous oxide."

In confirmation of this view, Mr. S. E. Wolf² has made a series of quantitative experiments, as follows, (using 30 gm. of bismuth subnitrate, dissolved in 30 cc. of nitric acid, with the aid of heat, and diluting with sufficient distilled water to make 150 cc.); 10 cc. of the solution were precipitated, first with 50 cc. cold water, secondly with 50 cc. boiling water, and, thirdly, with 500 cc. cold water; the precipitates were dried in an air-bath, weighed, then ignited and again weighed. A sample of bismuth subnitrate (iv.), prepared strictly in accordance with the U. S. P. (1870), formula was examined, in like manner. The results are as follows:

	I.	II.	III.	IV.
Weight of precip.,	1.0 gm.	1.05 gm.	.396 gm.	1.0 gm.
Weight of oxide,	.753 gm.	.855 gm.	.329 gm.	.865 gm.
Percentage of oxide,	.753	81.4	83.3	86.5

In corroboration of these statements we have just given, in this month's JOURNAL,³ the results of Mr. S. L. Rambo, who found, in drying four samples of the commercial salt, at 120°C., that the loss in weight, from the evaporation of moisture, varied between 2.0 and 3.42 per cent., and the oxide, resulting from ignition, weighed 79.2, 79.8, 80.2 and 80.25 per cent.; results agreeing fairly with those above.

Now the formula BiO NO_3 indicates 81.2 per cent. Bi_2O_3 , and the formula $\text{BiO NO}_3 \cdot \text{H}_2\text{O}$, (U. S. P. '80) equals 76.47 per cent. oxide, whereas the general results of Messrs. Wolf and Rambo plainly point to the first formula, and from these data it may safely be concluded that the varying quantities of moisture contained in commercial bismuth subnitrate is dependent, first, upon the relative quantity of water used to precipitate the oxysalt, and, secondly, upon the relative degree and duration of heat, with which the oxysalt is dried, and, that the contained water from its variations in quantities is not water of

¹ P. G. *vide* Nat. Dispensatory, 3d Edt., p. 322.

² AMER. JOUR. PHARM., Dec., 1882, p. 593-595.

³ Bis. Sub. Nit. AMER. JOUR. PHARM., Dec., 1886, p. 592.

crystallization, but merely adhering moisture readily dissipated by proper drying, and hence cannot be considered as existing in the state of chemical combination, any more than, for example, water contained in improperly-dried washed sulphur.

Returning to the consideration of the oxyiodide prepared by the process given above we find the precipitate to be a fine brick-red powder, odorless, very slightly astringent in taste, showing extremely minute cubical crystals, averaging about the 1-32 of an inch in diameter when magnified 900 diameters; insoluble in alcohol, ether or chloroform, and evincing the general properties of the compound of Messrs. Woodman and Tidy. Now, as before mentioned, the chemical character of this product depends directly upon the quantity of acid used to decompose the potassium salt. If too much acid has been used, the filtrate becomes red and tinges gelatinized starch blue, and black iodide is formed, resolvable by treatment with boiling water into the red oxyiodide.

There is an objection to the acceptance of this "trituration process," as a general one, while it is extremely simple, in that it requires an uncertain quantity of dilute nitric acid, a very careful manipulation, and a nice discrimination as to the exact point when the decomposition is complete. Hence it would, probably, be considered only as a tentative process, open for improvement. Subsequently, the author succeeded in devising a satisfactory modification of the existing precipitation method, which would be more practicable, in general employment, and more capable of yielding a constant product than that one. The following is the formula:

Take of

Bismuth subnitrate,	$\overline{\text{ss}}$ iiss, gr. xxiv.
Acid nitric,	$\text{f}\overline{\text{ss}}$ iii.
Hot water,	$\text{f}\overline{\text{ss}}$ xii.
Potassium iodide,	$\overline{\text{ss}}$ xi, gr. iii.
Hot water,	$\text{f}\overline{\text{ss}}$ xxviii.

Dissolve the bismuth salt in the acid in a porcelain capsule with the aid of heat and add 12 fluidounces of boiling water in small portions at a time, stirring after each addition. Then pour the bismuth solution in the hot water, in which has been dissolved the iodide, agitating it well after each addition. Continue agitating until decomposition is complete. Filter at once. Wash the precipitate with warm water, dry and powder.

Boiling, or nearly boiling water, is used to dilute the strong acid

solution, because it will, thereby, be able to stand more dilution without precipitation of oxysalt than with cold water. The black triiodide is first formed, which, on agitating the warm liquid for several minutes, gradually changes into the red oxyiodide. The bismuth solution is poured into the iodide, and not the reverse, in order to prevent the formation of oxynitrate. Hot water is used to precipitate the bismuth salt in, because it greatly facilitates and hastens the conversion of the black iodide into the red oxysalt. Yet, at the same time, care must be exercised that the liquid be not too hot when added together, otherwise the strong nitric acid will cause the decomposition of a portion of the oxyiodide with the formation of iodine fumes and the consequent weakening of the product in the amount of its combined iodine. The chemical reactions in the making and the properties of the finished product, are identical with those of the "trituration process." The yield is about the same.

Samples of the several products, as obtained in the course of experiments, are here presented for your inspection and criticism. No. 1 is impure black triiodide, made by triturating bismuth subnitrate with strong potassium iodide solution, adding strong hydrochloric acid and filtering, without washing, and drying. It is of a deep bluish-black color, which assumes a much lighter shade, when long triturated with cold water, from the gradual formation of a portion of oxysalt, and speedily changes into the red oxyiodide if triturated with boiling water. No. 2 is the so-called yellow iodide, made with bismuth subnitrate and potassium iodide in the presence of cold water. No. 3 is the same as No. 2, only made by boiling the two salts together, in water. No. 4 is the subiodide, so-called, made with Lugol's solution of iodine. No. 5 is pure subiodide purchased. No. 6 is pure subiodide made by trituration, in accordance with the first process. No. 7 was made by precipitation, in compliance with the second formula; and No. 8 was made by the formula of Mr. Mayo, given in AMER. JOURN. OF PHARM., December, 1886, p. 590. It contains considerable oxychloride as impurity.

Poisoning by Squill.—Several fatal cases of poisoning by squill are reported by Dr. E. B. Truman, (*Lancet*, Sept. 4, 1886), who owing to the variable composition of squill, regards it as an unreliable and unsafe drug.

THE SULPHUR INDUSTRY OF THE WEST.

BY HARRY C. MYERS.

Read at the Pharmaceutical Meeting, December 21.

The mineral deposits of our great West have for many years attracted a great deal of attention, both in this country and abroad. Besides the common minerals and compounds that chemists acknowledge as existing, there are beds of pure, white kaolin, mineral wax or ozocerite, borax, petroleum, bituminous coal veins forty feet thick, rich sulphur deposits, etc. The subject to which this article is confined is sulphur. Sulphur, I believe, is not recognized by text-books as existing to any extent in this country, and yet, in the Territory of Utah, there is, beyond doubt, the richest and largest known sulphur deposit in the world.

Sulphur is of volcanic origin, and existed in the interior of the earth; being heated there it escaped in the form of vapor, and was precipitated on coming in contact with the cold air. In order to refine this sulphur it is but necessary to repeat the process of nature by vaporizing and condensing.

It would seem by the extent and purity of *this* deposit, however, that at some remote period the sulphur must have poured out in a molten mass and flowed like lava into the valley beneath. This enormous deposit was located in about 1870, by the Government Surveyor, and is situated two hundred miles south of Salt Lake City, between the counties of Millard and Beaver on Cove Creek.

The deposit is about two thousand feet square, and shafts have been sunk in different places from thirty to sixty feet deep without reaching the bottom of the deposit; the depth is as yet unknown. It is easy to see by using these figures and multiplying by the weight of a cubic foot of sulphur, which is over a hundred pounds, that this deposit contains easily ten million tons of sulphur. The poorest ore yet found in this locality contains 40 per cent. sulphur, and is almost black in color; but as the 90 per cent. ore is inexhaustible the poorer ores are disregarded. These ores were analyzed at Case School of Applied Science, by a familiar process, and found to be absolutely free from arsenic and antimony, which cannot be said of our imported Sicily sulphur. The sulphur in this deposit is in strata, measuring from eleven to twenty-two inches in thickness, and as it is a surface deposit it is worked much like the quarrying of stone. It is then refined by a new process,

which consists of melting the sulphur, forcing and straining it through a cylinder by the heat and pressure of steam, and as the ore is only contaminated with lava sand, it is very easily separated.

In many parts of this deposit the vapors are still rising and the deposition is continuous. In sinking shafts the vapors are so intense that several workmen are required, for one man is soon overcome and another one must take his place; and often, birds and small animals enter the sulphur pits for shelter and are soon overcome and suffocated. In 1872, a party of business men endeavored to find the extent of this deposit. On camping out the first night, their tents were filled with vapors and they were nearly suffocated; next day they started to sink a shaft, again the vapors drove them away and they had nothing to show for their trouble except a pair of sore eyes apiece. On their return they reported the discovery of the infernal regions in active operation. The way in which this deposit was discovered is a rather peculiar one: it was noticed that at a certain time in the year, when the foliage of the trees was just beginning to appear, that wherever a tree was growing near a sulphur deposit it was greener and more advanced than the trees about it; knowing this fact, a single person was enabled to discover and locate fourteen deposits. This advanced growth was probably due to the warmth of the rising vapors. Soon after the discovery of these beds, some English capitalists sent over experienced men at a great expense, who, being ignorant of this fact, failed to make a single location.

A few years ago sulphur was discovered in Mt. Humboldt, Nevada, which was 98 per cent. pure, but it proved to be only a "pocket" and was soon exhausted. Rich deposits were also discovered in New Mexico as well as in California and Colorado; in fact, at the Exposition at New Orleans, nearly all the western States reported sulphur deposits and exhibited specimens of the ore, but owing to lack of railroad facility, or extent of the ore these deposits have not been operated to any degree.

The high rates of freight in the West have been a great drawback to the mining industries, and have compelled us to borrow of our neighbors when we have abundance at home. This is the case with our sulphur industries. We now import nine-tenths of our sulphur from Sicily. The ore there is taken from the bed of an extinct crater, several hundred feet below the surface, and is carried to the surface upon the backs of children. The ore does not average above 20 per cent. It is then partially refined and shipped to us as "crude sulphur;" this is done to

avoid the duty on the refined article, and as it is shipped *free* as ballast, it makes a cheap article with which American high-priced labor and freights will hardly allow of competition.

The great demand for sulphur is, of course, for the manufacturing of sulphuric acid, and it would seem at first sight that it would be necessary to ship our western sulphur to the east and supply this demand, in order to make the enterprise a profitable one; this, plainly enough, would eat up the profits. But such is not the case, the demand for sulphur in the West is enormous and is steadily increasing, and will continue to increase as long as the population increases and new industries are started in operation. Sulphur is used largely in the West, especially in Colorado, New Mexico, and Texas, as a "sheep dip." This "dip" is composed of sulphur and an alkali, and is used for cleansing the sheep and destroying a kind of itch that is common in that locality. The carrying out of this cleansing is compelled by law. Little towns in the West that are hardly noticeable on the maps and are almost unheard-of, purchase annually from five to ten carloads of sulphur. This sulphur is then sold to the various ranches in the vicinity and used as described. Sulphur, again, is largely used in restoring old vineyards, especially in California and that vicinity. It is also used in a variety of smaller ways that are well known in the East. The imports of this article in 1878 were 48,102 tons, and in 1886 were 117,538 tons, showing an increase of over sixty-nine thousand tons in the importation in eight years, and in the next eight years the increase, of course, will be much greater unless we bring our western sulphur into the market; and it *will* be brought into the market and will compete with the Sicily trade, just as sure as American energy and enterprise *continues* to be what it *has* been in the past.

SYRUP OF WILD CHERRY BARK AND NITROUS ETHER.

By THOS. S. WIEGAND.

Read at the Pharmaceutical Meeting, December 21.

A few weeks since, having occasion to make use of a cough mixture composed of acetate of morphine, syrup of squill and syrup of wild-cherry bark, and symptoms arising which rendered the use of sweet spirit of nitre desirable, an addition of 25 per cent. of that preparation was made to the first-named mixture; it apparently produced no

change but that of diluting the mixture, but upon examination the next morning the color was so much deepened that it appeared worthy of investigation. To this end a mixture of the syrups above described was made with spirit of nitre, one of syrup of squill and nitre, and another with syrup of wild-cherry bark and spirit of nitre, all in the proportion of one part of the spirit to three of the syrup.

The syrup first described and that of wild-cherry, became in the course of twelve hours, very much darker, the wild-cherry syrup and nitre if anything, darker than the other, while no perceptible difference could be observed in the mixture of squill and nitre. The change would seem to be dependant upon the coloring matter of the bark and the nitre as no iron could be detected in either the squill or nitre.

PRACTICAL NOTES FROM VARIOUS SOURCES.

BY THE EDITOR.

Methylal possesses anæsthetic and hypnotic properties according to the investigations of Personali of Turin (*Nouv. Rémèdes*, Oct. 15, p. 459). On injecting subcutaneously into dogs from 0.10 to 0.15 per cent. of their weight, methylal produced anæsthesia and deep sleep with suspended reflex action followed by rapid recovery and no ill effects. The heart-beats are somewhat augmented, the blood pressure is slightly decreased and the respiration is slower and deeper. It relieves the tetanic spasms caused by strychnine. Applied externally, in the form of liniment or ointment, containing 15 per cent. of methylal, it acts promptly as an anæsthetic; and taken internally, it relieves nervous pains of the stomach.

Methylal was first obtained pure by Malaguti (1839), by distilling 2 parts each of black oxide of manganese and methyl alcohol, with a cold mixture of 3 parts each of sulphuric acid and water, and treating the portion boiling below 60°C. with potassic hydrate. It is a thin, colorless liquid, of an agreeable odor resembling that of chloroform and acetic ether, has at 17°C. the spec. gr. 0.8551, and boils at 42°C. It has a warm, aromatic taste, is freely soluble in alcohol and ether, and dissolves in three volumes of water. Chemically, it is methylene-dimethylether, its composition being $\text{CH}_2 (\text{OCH}_3)_2$ or $\text{C}_3\text{H}_8\text{O}_2$.

Euclyptol is a mixture of salicylic acid 6 parts, carbolic acid 1 part, and oil of eucalyptus 1 part, which Dr. Schmeltz believes (*Bull. gén.*

de Thérap., 1886) to be preferable to most other antiseptics. Since carbolic acid cannot be detected by the usual tests in this mixture, the formation of a chemical compound seems to be indicated. It has a strong, aromatic odor and an acrid, burning taste, dissolves readily in alcohol, ether, chloroform and a mixture of equal parts of alcohol and glycerin, also in alkalies, but is sparingly soluble in water. Urine to which a small quantity of eulyptol has been added, remains unchanged for fully a month.

Hypodermic injection of cocaine and mercury, useful in syphilitic disorders, is recommended by Dr. Mandelbaum (*Monatsh. f. pr. Dermat.*) to be prepared as follows:

Cocaine hydrochlorate.....	0.050 gm. (gr. $\frac{3}{4}$).
Mercuric cyanide.....	0.001 " (gr. $\frac{1}{7}$).
Distilled water.....	15 drops.

Administration of Paraldehyde.—Dr. R. G. Eccles recommends the following as being the least disagreeable way of administering paraldehyde:

R Paraldehyde,	
Almond-oil.....	each, ʒij;
Chloroform.....	℥x;
Oil of cinnamon.....	℥ij.

One half to be taken at bedtime, and the remainder during the night, if required. He states that it agreed with the stomach, and would often settle one that was unsettled. It could be taken undiluted.—*N. Y. Med. Jour.*, Dec. 25, 1886.

Thymol as a tenicide and tenifuge, is recommended by Dr. Numa Campi, its action being simple and rapid, and unaccompanied by any disturbance, except a depressing effect, easily counteracted. In the evening he ordered 20 gm. (ʒv) of castor oil to be taken fasting; in the morning he prescribed 8 gm. (ʒii) of thymol, divided into twelve doses, one to be taken every quarter of an hour; twenty minutes after the last dose had been swallowed, another 20 gm. (ʒv) of castor oil were taken. A few minutes after a *tenia medio-canellata* three and a half meters in length was evacuated, the head being dead. The depressing effects were promptly counteracted by the use of stimulants, cognac and rum being suitable for the purpose.—*Buffalo Med. Jour.* Oct. 1886.

The decomposition of ergotin solutions.—As a result of elaborate bacteriological studies, Engelmann, of Kreuznach, presents the following conclusions :

1. Pure ergotin, unmixed, and dispensed in sterilized glass, may be preserved almost indefinitely.

2. Aqueous solutions of ergotin undergo a more or less speedy decomposition. This is due to the action of micro-organisms.

3. Such solutions, when introduced subcutaneously, induce varying degrees of inflammation.

4. The addition of antiseptic agents to such solutions, as ordinarily practised, only delays the decomposition.

5. In order completely to prevent the development of living ferments, the antiseptic must be added in quantities which are directly irritating, and which, in frequent use, are not indifferent in their action upon the organism of the patient.

6. Ergotin solutions may be quite far advanced in decomposition before the eye can detect such change.

7. Ergotin may be most advantageously administered subcutaneously, when dissolved in water previously sterilized by a half hour's boiling.

8. The solution may be best effected in the syringe itself.

9. The distilled water of the apothecaries usually contains bacteria, often to such an extent that from a single drop there may be cultivated upon the gelatin plate many thousands of colonies.

10. In all solutions of drugs to be used subcutaneously, it is therefore advisable that the water should be sterilized by prolonged boiling just previous to its use.

11. The decomposition of pure ergotin has been found to be due to bacterial impurities on the glass vessels used. A large number of micro-organisms cause decomposition in the solutions ; the ordinary bacteria of decomposition, however, are the most active.—*Deutsche medicinische Wochenschrift*, Sept. 30, 1886. *Med. News.*

Urinary colorations from chrysophanic acid and from santonin.—It is known that the urine of persons to whom santonin, senna, rhubarb, or chrysarobin have been given takes on a red color when treated with alkalis. In the three last cases, this property is owing to the presence of chrysophanic acid, but we do not yet know the nature of the substance derived from santonin. According to Hoppe-Seyler

one can distinguish the coloration due to santonin from that which chrysophanic acid produces by adding caustic soda to the urine and then shaking up with amylic alcohol. When the coloration proceeds from santonin, the coloring matter passes almost entirely into the alcohol, and the urine is decolorized, whilst, if the color is due to chrysophanic acid, the alcohol takes up only traces, and the urine remains red. On the contrary, if the urine is acidulated, the chrysophanic acid can be taken up by the amylic alcohol; if one then shakes this dissolvent with ammoniated water, the aqueous layer becomes red. Under the same conditions the coloring matter proceeding from santonin is not taken up. The spectrum of these two products totally differs.—*Berliner klinische Wochenschrift. Med. Chronicle*, Oct. 1886.

AMMONIO-NITRATE OF SILVER.

BY HARRY NAPIER DRAPER, F.C.S., M.R.I.A.

It is not a little remarkable that the phenomena attendant upon so familiar a process as the preparation of a solution of silver ammonio-nitrate should remain absolutely unnoticed by the text-books. One of the most recent and best of these indeed warns the student against the evaporation of the liquid "as there is a risk of producing an explosive body," and only one chemist, as far as I can find, has ventured upon an opinion as to the nature of the precipitate formed on the addition of ammonia to silver nitrate. Prescott¹ looks upon it as $(\text{NH}_3\text{Ag})_2\text{O}$; admitting, however, that this formula is merely hypothetical.

I cannot think that it will be uninteresting if I shortly state the circumstances under which some years ago my attention was directed to this subject. There is a very excellent and frequently used method of glass silvering particularly applicable to the production of telescopic specula, which, shortly described, consists in the reduction by milk sugar of an ammoniacal solution of silver nitrate to which potassium hydrate has been added.

¹ *Journal of American Chemical Society*, and *Chemical News*, vol. xlii., p. 31.

I have abundant reason to know that with ordinary precaution this process can be carried out with perfect safety; but that no departure should be made from the prescribed conditions, and that especially the silver solution should not be left about unheeded was sufficiently demonstrated by the circumstance which I now detail.

To a solution of 3.3 grammes silver nitrate enough ammonia was added to re-dissolve the precipitate at first formed, and then 5 grammes of pure caustic potash. The precipitate produced by the potash was (nearly) dissolved by a further addition of ammonia. The entire volume of the liquid was 50 cc. It was inadvertently left in an uncovered beaker during nine days, and on being then examined its surface was found to be covered with a broken-up, lustrous, graphitic film. The internal walls of the beaker were coated with a closely adherent continuous deposit, which might have been taken for metallic silver, were it not that its color more nearly resembled that of the lead-sulphide which is reduced by sulpho-carbamide. I poured from the beaker into the laboratory sink a perfectly clear liquid, but observing at the bottom a nearly black pulverulent deposit, I, in a weak moment, turned upon this a stream of water from the tap. Here my observations, as regards any practical usefulness, came for the time to an end, for there was a violent explosion which so completely shattered the beaker as not to leave a fragment of it in my hands, which were somewhat severely cut, and I was made deaf for several hours.

It was pretty clear from the outset that under conditions not quite expected, I had inadvertently produced the compound of silver with ammonia known as Berthollet's fulminating silver, and which has also been viewed as a nitride of the metal. These conditions seemed to be sufficiently interesting for examination, and with the double object of doing this and of arriving at the principle upon which the silvering process was based, I began a series of experiments.

That up to the present these have not been carried so far as was first intended, is due, firstly, to the fact that at a very early stage of the work the theory of the process became sufficiently intelligible to render its further prosecution unnecessary, and, secondly, to a not unnatural sympathy with the many chemists who, though they have told us something about the physical characters of this remarkably treacherous explosive compound, seemed to have unanimously agreed that its

ultimate analysis might be just as well left unattempted. But some of the results obtained (notes by the way, so to speak), affecting as they do the relations between two so familiar bodies as silver and ammonia are I think quite interesting enough to be noted. It is true that I have sometimes found after a tiresome search into the literature of the subject that they had been observed before; but they were so unfamiliar to myself, and are so persistently ignored by the ordinary textbooks, that I venture to think there may be others for whom also they may have interest. I propose to state these results in the form of memoranda and as concisely as possible.

When ammonia is added to solution of neutral silver nitrate, the first drop produces a precipitate which is *brownish-white*. As more ammonia is added, the precipitate becomes darker, and just before the point of final solution is reached, it is *dark brown*.

This precipitate is slightly soluble in water.

The smallest addition of nitric acid to a neutral solution of silver nitrate completely prevents its precipitation by ammonia.

The first addition of ammonia to a solution of silver nitrate renders it alkaline to turmeric paper and phenolphthalein, but the solution does not smell of ammonia.

Silver oxide, freshly precipitated by KHO and thoroughly washed, strongly browns turmeric paper.

Freshly precipitated silver oxide is readily soluble in a neutral solution of ammonium nitrate and the solution is strongly alkaline to turmeric paper.

In the following experiments a solution of ammonia was used of which 10 cc. required for neutralization 16.37 cc. of standard solution of oxalic acid. 100 cc. therefore contained 27 grammes NH_3 .

To the solution of 8.5 grammes silver nitrate in 70 cc. water the standard ammonia solution was added from a burette until the precipitate at first formed was redissolved.

The quantity of ammonia solution required was 6.6 cc. (theory requires 6.3 cc.).

Ten test tubes, each containing the solution of 1.7 grammes silver nitrate in 17 cc. of water (the solution having been made neutral by digestion with precipitated silver), were arranged in series. To tube 10 was added just so much of the standard ammonia as was necessary to redissolve the precipitate at first formed. This quantity was 1.3

cc. To the other nine tubes the ammonia solution was added in decreasing proportion, thus :—

Number of tube.	Cubic centimeters NH_4OH added.	Weight of precipitate in grammes.
10	1.30	
9	1.17	0.008
8	1.04	
7	0.91	0.054
6	0.78	
5	0.65	0.076
4	0.52	
3	0.39	0.069
2	0.26	
1	0.13	0.044

In none of the filtrates did either ammonia or silver nitrate give a precipitate. As nearly as could be noted by observation the amount of precipitate increases from No. 1 to No. 3 and in No. 5 seems to attain its maximum.

It then diminished, until in tube No. 9 there was but little apparent precipitate.

To obtain more precise results weighings were made of the precipitates in alternate tubes and the result of these are given in the third column of the table.

As it was obviously important that this precipitate should be examined, and as the maximum quantity obtainable was only equal to 4.47 per cent. of the silver nitrate employed, its preparation on a larger scale became necessary. One hundred and seventy grammes silver nitrate were dissolved in 170 cc. distilled water and 64.5 cc. of the ammonia solution added; just half the quantity required for re-solution of the precipitate. The liquid became very hot, but the filtrate afforded no further precipitate either on cooling or on dilution with water. A determination in it of the silver as chloride showed that only 11 per cent. of the nitrate had been precipitated, and therefore that the remaining 89 per cent. had been dissolved in the ammonium nitrate formed.

The precipitate was collected and examined after being simply air-dried under a bell glass.

Heated at 100° C. it did not lose weight.

Heated to redness, it afforded a residue of metallic silver which was weighed, and the loss of weight compared with that which would have occurred with silver oxide.

(a) 1.249 grammes gave Ag 1.141, a loss of 20.60 where $\text{Ag}_2\text{O}=16$.

(b) 0.915 grammes gave Ag 0.836, a loss of 20.01 where $\text{Ag}_2\text{O}=16$.

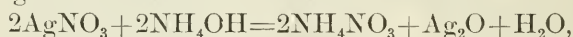
The precipitate heated alone, or with potassium hydrate, does not evolve ammonia.

Dissolved in dilute nitric acid, bubbles of gas are evolved.

The precipitate is therefore silver oxide, apparently mixed with silver carbonate, formed by the absorption of carbonic acid gas during drying.

The conclusions which may, I think, be drawn from the foregoing experiments are as follows:—

When ammonia is added to a solution of *neutral* silver nitrate the first addition produces a precipitate of silver oxide (if the solution be acid no precipitate is formed, the oxide dissolving in the simultaneously produced ammonium nitrate). When the quantity of ammonia added is just enough to form ammonium nitrate the reaction



takes place, but by far the greater part of the silver oxide dissolves in the ammonium nitrate formed, and it is only on the further addition of ammonia and silver-ammonium nitrate ($\text{AgNO}_3, 2\text{NH}_3$) is produced—



a result which may also be obtained by the solution of silver oxide in a mixture of ammonium nitrate with ammonia,

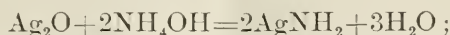


This body, described by Mitscherlich,¹ may be obtained by the slow evaporation of its solution. It forms rhombic crystals permanent in the air, and easily soluble in water. Their solution reacts strongly alkaline towards both phenolphthalein and turmeric. When heated—as may be done with perfect safety—they fuse, and leave a residue of metallic silver.

It is this compound which is contained in the ammonia-nitrate of silver solution of the Pharmacopœia, and of our laboratories, and I cannot fitly conclude this paper without pointing out that it is a very

¹ Gmelin, vol. vi., p. 177.

different substance from that obtained by dissolving silver oxide in ammonia, or by adding potassium or sodium hydrate to any solution of silver containing ammonia. The former may, as I have already noted, be heated even to redness with impunity, while the solution $\text{Ag}_2\text{O} + 4\text{NH}_4\text{OH}$, on losing by exposure to the air two molecules of ammonia, splits up with treacherous facility, and probably in the following way:—



into water and Berthollet's fulminating silver, the body with the mention of which I have introduced this subject, and with which the cultivation of a closer acquaintance is little desirable.—*Phar. Jour. and Trans.*, Dec. 18, 1886, p. 487.

THE ASH OF SOME PHARMACEUTICALLY IMPORTANT SEEDS, FRUITS, ETC.¹

BY H. WARNECKE.

As statements respecting the ash yielded by many seeds, fruits and parts of fruits, are entirely absent from manuals of pharmacognosy, notwithstanding that the determination of the ash is of great importance in the examination of a powder for mineral admixtures, the author offers this paper as a contribution to the history of the subject.

In the determination of the ash about 3 grams of a selected air-dried sample was rubbed to a coarse powder in an iron mortar, or in some cases (strychnos seeds, tonka beans, etc.), simply cut into small pieces, and after carefully taking the weight, incinerated in a weighed platinum capsule, in the way recommended by E. Reichardt. The uncovered capsule was brought about 2 centimetres above the opening of a Bunsen burner, and the flame allowed to play over the dish, when the gases evolved ignited and the mass was reduced in two or three minutes to a porous coal. The capsule was then placed obliquely upon the triangle and the incineration continued gently so that only the lower part of the capsule appeared red, the current of air being increased by placing the cover with its concave side inward in the opening of the capsule. After one or two hours the whole of the carbon was burnt off. During the operation stirring was avoided, so that the mass might remain as loose as possible; neither was the flame increased, on account

¹From the *Pharmaceutische Zeitung*, September 8.

of the volatility of many of the ash constituents and to avoid the running together of the alkaline ash. Finally the capsule was allowed to cool in an exsiccator and weighed.

The following figures refer to the air-dried substance and give the average of several closely concordant analytical results:—

	Per cent.		Per cent.
Semen Colchici.....	2.66	Fructus Anisi religiosi.....	2.02
“ Sabadillæ.....	3.45	“ Colæ.....	2.53
“ Myristicæ ¹	2.60	“ Aurantii immaturi.....	5.85
Macis.....	1.39	Flavedo Fructus Aurantii.....	3.90
“ after removal of 30.13 per cent. of fat.....	2.74	Cortex Fructus Aurantii, with the white inner tissue removed	5.28
Semen Staphisagriæ.....	9.88	“ Fructus citri.....	3.55
“ Nigellæ.....	3.67	“ Fructus Belæ Indicæ.....	2.08
“ Sinapis albæ.....	4.63	Pulpa Fructus Belæ Indicæ.....	3.72
“ Rapæ.....	4.36	Fructus Anacardii occidentalis...	1.64
“ Gossypii arborei.....	4.49	“ Anacardii orientalis.....	2.14
Cotton Seed Flour.....	6.85	“ Rhamni cathartici maturi	2.80
Pasta Guarana.....	1.36	“ Rhamni cathartici imma- turi.....	3.67
Semen Cydoniæ.....	3.55	“ Petroselinii.....	7.04
“ Abri precatorii.....	2.79	“ Carui.....	5.27
“ Tonco.....	3.57	“ Ajowan.....	10.45
“ Hyoscyami.....	4.51	“ Anisi.....	6.70
“ Belladonnæ.....	2.22	“ Fœniculi.....	7.25
“ Strychni.....	1.14	“ Dauci silvestris.....	5.96
“ Ignatii.....	2.34	“ Cumini.....	8.09
“ Curcurbitæ.....	2.88	“ Conii.....	6.69
Fructus Cardamomi.....	6.12	“ Coriandri.....	5.21
Cubebæ.....	5.45	“ Pimentæ.....	4.00
Fructus Cannabis.....	4.83	“ Capsici.....	4.66
“ Cocculi.....	5.20	Piper Cayennense.....	4.54
“ Anisi stellati.....	2.16		

Glandulæ Lupuli are required by the Pharmacopœa Germanica to contain less than 10 per cent. of ash, but the author has not met with any sample that answered to this requirement.² All the samples were contaminated with sand, which upon shaking with chloroform sank to the bottom, the glands floating above. A sample from Wiggers' collection left upon combustion 15.33 per cent. of residue, whilst other samples from various pharmacists and drug houses, gave 18.14, 23.6,

¹By boiling pulv. sem. myristicæ with benzol for two hours in a return condenser 41.25 per cent. of fat was removed. The dried residual powder gave 3.77 per cent. of ash.

²The British Pharmacopœia allows 15 per cent., the U.S.P., only 8 per cent.

and even 44.76 per cent. ; of the last mentioned 4 to 5 per cent. dissolved in hydrochloric acid the remainder being admixed sand. In order to ascertain the true ash content of hop glands the author tried to free a quantity from sand by washing it with water six times in a large beaker. After drying over sulphuric acid the lupulin gave upon incineration an average of 10.81 of residue, which still contained some sand adherent to the sticky glands. Flückiger found in a good sample, dried in a water bath, 7.7 per cent. of ash.

In conclusion the author estimates the ash in ipecacuanha root at 1.98 per cent. ; the wood giving 1.37 per cent. and the bark 2.25 per cent.—*Phar. Jour. and Trans.*, Sept. 23, 1886, p. 330.

ON ETHOXYCAFFEINE.

By D. J. LEECH.

Four or five years ago Fischer (*Berichte der deutsch. chem. Gesellschaft*, 1881 and 1882, see AMER. JOUR. PHAR. 1882, p. 218, and 1883, p. 551), published a series of papers bearing on the chemical constitution of caffeine, theobromine, xanthine, and some of their derivatives. He showed that a close relationship exists between these three substances, theobromine being dimethylxanthine, that is xanthine in which two equivalents of hydrogen are replaced by two of methyl, whilst caffeine is trimethylxanthine, three equivalents of hydrogen being here replaced by three of methyl. He showed, too, that it is possible to carry such substitution farther, and to replace one or two atoms of hydrogen in the caffeine by one or two of hydroxyl, methoxyl, or ethoxyl. By so doing compounds are produced to which he gave the names hydroxycaffeine, dihydroxycaffeine, ethoxycaffeine.

Filehn (*Archiv für Anat. und Phys.*, 1886) records experiments on the physiological action of the compounds thus formed. He finds that 0.2 gm. of hydroxycaffeine is required to produce on the muscular system of the frog such rigidity as follows 7 milligrams of caffeine. If two equivalents of hydrogen be replaced by hydroxyl the compound (dihydroxycaffeine) produces no effect on the muscular system. So far the experiments only indicated another interesting relationship between chemical composition and physiological action, but his examination of ethoxycaffeine seems likely to be of direct therapeutic

value. He found that in frogs the substitution of an atom of ethoxyl for an atom of hydrogen in caffeine effected a very great modification in physiological action, for ethoxycaffeine, instead of causing rigidity of the muscles and tetaniform spasm, has a narcotic effect and diminishes reflex excitability.

Trying next the effect of the new compound on mammals he found that 0.5 gm. caused sleep in rabbits, spinal symptoms only appearing after the administration of a gram. Experimenting finally on man he noted vertigo, intellectual torpor, sometimes also pain in the head, after the exhibition of 0.5 to 0.75 gm. of ethoxycaffeine, and suggested the possibility that it might be useful in migraine.

Dujardin-Beaumetz (*Bull. gén. de Thérap.*, March 30, 1886,) has made further experiments with a quantity of the drug placed at his disposal by Filehne. It is in the form of white crystals, and quite insoluble in water, but like caffeine, its solution may be effected by the addition of salicylate of sodium. On injecting 0.01—0.08 gm. into the guinea-pig he noticed increased action of the heart and diuresis, and also sleepiness, with such paresis of the eyelids that the animal could hardly open its eyes even when stimulated. The drug was rapidly eliminated by the urine, but a larger dose than 0.1 gm. caused convulsions and death.

Dujardin-Beaumetz next tried the drug on patients suffering from pains in the head, giving 3—15 grains per diem, either in cachets or solution. It is apt to cause stomach troubles, heat at the epigastrium, nausea, and vomiting, and as this is especially the case when it is given in catches he employed the following solution:—

Ethoxycaffeine.....	3½gr.
Salicylate of sodium	3½gr.
Hydrochlorate of cocaine.....	1½gr.
Syrup and water.....	3oz.

The cocaine is added to minimise gastric irritation.

In facial neuralgia 7½—15 grains daily gave relief and even caused sleep, but its action did not compare favorably with aconitine. But in migraine he obtained very satisfactory results from the new drug by giving 3¾ grains as soon as the symptoms of the attack appeared. To one of his pupils, who suffered from intense migraine, he gave 7½ grains of ethoxycaffeine. Two hours afterwards the pains had completely disappeared, and the patient slept. On awakening there was neither pain nor loss of appetite. In another case, 3¾ grains given at

the height of an attack gave relief in an hour. A larger dose than 3 or 4 grains, should not, as a rule, be given; 7—8 grains is apt to cause cramp, nausea, and a sensation of discomfort.

Dr. Chabot, a pupil of Dujardin-Beaumetz, records other cases of the successful treatment of migraine by ethoxycaffeine. In a man, aged 52, with a very painful zona, 15 grains of ethoxycaffeine taken in five doses at intervals of half-an-hour, procured sleep, which morphine injections had failed to induce. A nervous and anemic woman, suffering from almost constant cephalagia and insomnia, found $7\frac{1}{2}$ grains, given in five doses, to cause sleep. On previous nights opium had produced but little rest. In this case some nausea and vomiting followed the use of the drug. Two other successful cases are also recorded, and it seems possible that we have in ethoxycaffeine a powerful agent for cutting short attacks of migraine.—*Med. Chronicle*, November 1886, p. 138.

NOTE UPON THE CONVERSION OF STARCH INTO GLUCOSE BY MEANS OF HYDROCHLORIC ACID.

BY SIDNEY HARVEY, F.C.S.

Read at Meeting of Public Analysts, November 10th, 1886.

A paper on the analysis of pepper, by Mr. Heisch, read at the Maidstone meeting, and printed in the October number of the *Analyst*, includes a process for starch estimation by means of hydrochloric acid and the polarimeter, and as a great number of methods are recommended in various works for this purpose, and the above appeared to be definite, simple, and easy of execution, I was anxious, at the earliest opportunity to verify the results, and with that object I have, during the last six weeks, made a large number of experiments.

It must be understood that I confined myself *exclusively* to the action of solution of "HCl" upon the purest starches I could obtain, and I started with the following assumptions, viz. :—

(1) That incomplete conversion into dextrose by boiling with "HCl" would be shown by the polarimeter yielding excessively high results (when calculated as dextrose) as compared with the estimation by means of "copper," due, of course, to the high rotating powers of the intermediate principles formed.

(2) That an agreement between the results afforded by the optical and copper methods, while proving the conversion to be complete, required necessarily to tally with the real amount of dextrose known to be represented by the quantity of starch operated upon.

My procedure was as follows:—Ten grammes of starch were heated in flask provided with condenser, with 190 cc. of the dilute "HCl" for the prescribed time. The solution was next cooled, made up to 200 cc., and filtered, in some cases decolorized. It was subsequently polarized, using the half-shadow instrument; a portion was also neutralized, suitably diluted, and estimated volumetrically by "copper."

Repeated experiments were made in both cases, and the averages taken.

My results are tabulated below, and may be summed up thus:—

(1) That immersing the flask containing the mixture in a boiling-water bath was equally efficient with boiling by the direct application of flame.

(2) That in all cases where the conversion was complete my results were *seriously below* the truth to the extent of from four to seven per cent.

(3) That it was difficult, if not impossible, so to limit the time of heating as to prevent the destruction of some of the newly-formed dextrose.

(4) That prolonged heating resulted in regularly diminishing dextrose.

In conclusion, while regretting my inability to confirm some of Mr. Heisch's results, I am of opinion that the main issues of that gentleman's paper continue unaffected, viz., that the percentage of starch in ash and water-free pepper is remarkably constant, and that the estimation of the former affords valuable aid in the analysis of the latter.

I would also refer to some researches bearing on this subject by F. Allihn, published in the *Journal of the Chemical Society*, vol. 46 (abstracts), p. 721, in which the results appear to confirm mine.

I have also pleasure in acknowledging the assistance of my friend and pupil, Mr. John Howard, during my long and somewhat tedious work.

Composition of starches operated upon :

	Wheat.	Rice.
Dry starch...	85.56	86.61
Water.....	13.63	12.77
Impurities...	0.81	0.62
	<hr/>	<hr/>
	100.00	100.00

100 parts of starch operated upon in every case.

	Dry Starch.	Equivalent in Glucose.	Method.	Time.	Stren'th of HCl.	Glucose by Pol'm'ter.	Glucose by Copper.	Result.
Wheat	85.56	95.07	Boiled direct	2 hours	10 p. c.	87.80	87.75	loss
"	"	"	Water-bath	3 "	10 p. c.	88.24	88.26	loss
"	"	"	"	1 hour	5 p. c.	93.76	91.08	incompl'te
Rice	86.61	96.23	"	1 "	10 p. c.	91.84	91.74	loss
"	"	"	"	2 hours	10 p. c.	90.86	90.91	loss
"	"	"	"	3 "	10 p. c.	89.94	90.69	loss
"	"	"	"	30 min.	10 p. c.	129.98	—	incompl'te
"	"	"	"	50 "	10 p. c.	101.38	84.74	incompl'te
"	"	"	"	2 hours	10 p. c.	91.84	84.74	loss

—*The Analyst*, December, 1886, p. 221.

THE OTTO OF ROSE INDUSTRY.

Mr. Ernst Schmalfuss, a German horticulturist, has been spending a considerable time in Bulgaria to investigate the conditions of the otto of rose industry in that country. Mr. Schmalfuss went to Bulgaria as the agent of a German firm of essential oil distillers who have lately been endeavoring to create an otto of rose industry in Germany, and who desired to have an expert's opinion on the question whether it is feasible to grow the Thracian rose in Western Europe.

The information which has been collected belongs of course to the firm who bore the expense of the journey, but Mr. Schmalfuss has obtained their permission to publish certain details on the subject of his investigations. Mr. Schmalfuss went to Bulgaria with an open mind, and returned thence a firm believer in the future of an otto industry in Western Europe.

There are two principal rose-growing districts in Bulgaria, the one extending from Yeni-Sagra to Carlowa on the southerly slopes of the Balkans, and the other situated near Chirpan, south of the Karadsha-Dagh. The most widely-different estimates prevail regarding the total area under cultivation, and no reliable figures are obtainable. There is much variation in the soil of the rose-districts, the prevailing formation being a light loam, rich in lime (1.26 per cent.) but almost devoid of phosphoric acid, of which only traces were found in a sample sent to Germany for analysis.

The proportion of nitrogen is moderate, being 0.14 per cent., but the soil is remarkable for its richness in potassium, of which 0.64 per cent. was present in the specimen analyzed. It is not known whether the presence of potassium exercises a special influence on the growth of the flowers; if so, the application of potash-manure would be advisable. In Bulgaria the rose-fields are sheltered from the north wind by the mountain ranges against which they are situated, but it is thought that it would be rather an advantage than otherwise if they were from time to time exposed to a cool wind, the plants being singularly hardy and able to withstand without injury a temperature of -4° Fahr. On the other hand, scarcely a season passes in which the plants do not suffer from excessive heat, the high temperature prevailing during certain months being, in fact, the greatest enemy of the shrubs during the flowering and gathering time.

The variety which is used for distilling purposes in Bulgaria is the so-called Thracian rose, a plant of exceedingly rapid growth, flowering sparingly in the first year, and yielding a full crop on the third, when it attains maturity. It is said that, under certain conditions, the plants attain an age of fifty years. The plant bears red or white flowers, the former being about five times as numerous as the latter. Both varieties of flowers are of a very powerful and agreeable odor, but the oil distilled from the white flowers is the finest, although the red roses are richer in essential oil. The Thracian rose exceeds all other varieties in flowering property, weak specimens bearing as many as 500 flowers, while fine plants, if properly cultivated, are able to produce nearly double that number. The roses are small and light, about 220 fresh flowers going to the lb., or about twice the number of ordinary centifolia flowers which are required to make up that weight.

The flowers of the Thracian rose are rather thin, and their richness in essential oils lies in the ovary and the stamens (of which there are an extraordinary number), rather than in the petals. For distilling purposes the entire flower of the Thracian rose is taken, while of the other varieties the corolla leaves alone are employed. Almost every small Bulgarian farmer distills his own oil, the stills used being of the most elementary description, and it is thought that if a Western firm were to undertake the distilling a larger percentage and better quality of oil might easily be obtained. The roses are grown in fields, where they are placed in rows about 2 yards apart, and alternating with rows of grape vines or kitchen vegetables. To a practical man it would appear that in the Bulgarian fields the plants are grown too closely together and have no room left to expand properly. As hints to intending experimenters in Western Europe, Mr. Schmalfuss recommends that the soil should be well manured with old, partly-decomposed manure, the application of which should be repeated every third year. The plants should be placed in rows, about 8,000 trees to the acre, and during the first two years the rows of rose-plants may alternate with rows of kitchen vegetables. It may be found to pay to cut the shrubs in the second year close to the ground. The yield of that year is of course lost by this proceeding, but the luxuriance of the plant for the future is thereby much increased. After the third year the planting of vegetables must be discontinued. The soil must be kept free from weeds and rendered loose twice a year by hoeing. The fields might, experimentally, be protected at the north side by hedges. The flowers must be gathered early in the morning and placed loosely in open baskets, which should be kept in the shade.

Of the roses common in Western Europe the light and dark red varieties of moss, Bourbon, and Remontant roses are richest in essential oil, and might be employed advantageously, Mr. Schmalfuss thinks, so long as the Thracian roses are not obtainable in quantities. Unfortunately, it would appear that, for the present at least, there is no prospect of a supply of Thracian roses sufficient to admit of a proper experiment. When Mr. Schmalfuss commenced his investigations in Bulgaria he did not meet with any considerable opposition on the part of the native otto merchants, who, at that time, appear to have been perfectly skeptical regarding the possibility of the remunerative distillation of otto outside

their own country. But when Mr. Schmalfuss, encouraged by his success, endeavored to obtain a first wagon-load of plants for export to Germany, the Bulgarian otto trade suddenly raised an outcry and prevailed upon the Government to issue an order strictly prohibiting the export of plants. Efforts will be made to obtain the repeal of this order, and Mr. Schmalfuss' friends are sanguine that at any rate they will ultimately succeed in obtaining a sufficient number of plants; but for the moment their plans, so far as the wholesale import of Traician roses into Germany is concerned, are frustrated.—*The Chemist and Druggist*, December, 1886, p. 809.

NOTES ON A SAMPLE OF GALBANUM FROM FERULA GALBANIFLUA.¹

BY E. G. BAKER.

The following are a few notes on a sample of galbanum collected by Dr. Aitchison, Surgeon-Major, in Afghanistan, and brought back by him, together with the plant from which it was collected. The plant has been identified by Mr. Hemsley, of the Kew Herbarium, as *Ferula galbaniflua*, Boiss. et Buhse.

The gum-resin consisted of agglutinated tears of a white or reddish-brown color, usually compact and hard, but softening if held in the hand.

When broken it presents a dull white waxy fracture resembling ordinary ammoniacum, in fact, judging from external appearances, it might easily be mistaken for a sample of that drug.

Its odor is peculiar, but not unpleasant. Mixed with the gum-resin, portions of the stem from which it was obtained were found.

From the sample handed over to me for examination, a portion was selected fairly representative of the whole; this was powdered and sifted through muslin, and then treated with the following solvents:

Petroleum Ether.—Of the sifted gum-resin I took 5 grams, and treated it with 50 cc. of petroleum ether—allowing the mixture to remain in a suitable vessel for several days, during which time it was frequently agitated. I then decanted the fluid portion into a tared dish, rinsed the vessel out with more petroleum ether, and evaporated

¹ Read at an Evening Meeting of the Pharmaceutical Society, Wednesday, December 8, 1886.

the whole of it as recommended by Dragendorff, in a current of dry air, the air being dried by passing through sulphuric acid and over chloride of calcium.

The petroleum ether extracted .1254 gram; adding to this .03 as the loss during evaporation would give .1554 gram or 3.1080 per cent.

Ether.—The portion of the 5 grams remaining from the petroleum ether extraction was next treated with ether and allowed to remain as before. This was decanted and evaporated over a water-bath. It was only after several days that the weight was found to be constant, at the latter stages of the operation the evaporation taking place slowly. The matter extracted by ether was found to weigh 3.060 grams. This was then treated with alcohol, in which it was almost wholly soluble, .226 gram of the 3.060 grams remaining undissolved.

The alcoholic extractive was evaporated, and consisted of a brittle resin, the melting point of which, when taken over mercury, was found to be 57° C. The resin was soluble in soda, from which it was reprecipitated by an acid.

Alcohol.—The portion of the gum-resin remaining from the ether extraction was next treated with alcohol. The resulting fluid was evaporated over a water-bath. The residue weighed .3788 gram.

Water.—The portion of the gum-resin remaining from the alcohol extraction was next treated with distilled water. The filtrate evaporated over a water-bath yielded .8514 gram of residue.

The latter was again treated with water, and various reagents applied. With ammonium oxalate and subacetate of lead the solution of gum gave copious precipitates, but none with acetate of lead or borax.

Insoluble Matter.—The portion of the gum-resin insoluble in petroleum ether, ether, alcohol and water, was found to weigh .5280 gram.

Volatile Oil and Moisture.—.7876 gram of the powdered gum-resin above referred to was next taken; this, after several days' evaporation, lost .042 gram, which would represent 5.332 per cent., and would be the volatile oil and moisture.

Ash.—In order to determine the ash 1.5792 gram of the gum-resin was taken and burnt in a furnace. The ash, which was white, weighed .039 gram; this would represent 2.463 per cent.

Upon examination the ash was found to consist of carbonates of calcium and sodium, sulphates and phosphates being absent.

When examined by the spectroscope the sodium and calcium bands were plainly visible. There was also a band in the red to the right of the calcium bands, which might possibly be strontium. The quantity present was not sufficient for a determination of its position.

Action of Gum-Resin with various Reagents.—Sulphuric acid turned the gum-resin dark brown. Hydrochloric acid gave no well-marked action in the cold, but when a portion of the gum-resin was boiled with this acid a dirty red color was obtained, which underwent no change on the addition of alcohol.

A small portion of the gum-resin was boiled with water, and when cold, ammonia added; a very slight blue fluorescence was visible, which indicates the presence of umbelliferon $C_9H_6O_3$. To confirm the result a portion of the gum resin was heated for some time with hydrochloric acid at $100^\circ C.$; this, when cold, was put into a glass separator with some chloroform, and after agitation, the chloroformic layer drawn and evaporated. No crystals were visible, but when the evaporated chloroformic layer was extracted with water and ammonia added, a decided blue fluorescence was seen.

I then fused a portion of the gum resin with nitre, extracted the mass with water, and added barium chloride; this gave a precipitate wholly soluble in acid, indicating the absence of sulphur in the drug.

The analysis is then as follows:

	Grams.	Per cent.
Volatile oil.....	1554	= 3.108
Ether extractive } resin	30600	= 61.200
Alcohol extractive }	3788	= 7.576
Water extractive, gum.....	8514	= 17.028
Insoluble matter	5280	= 10.560

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The foregoing experiments were made in the Pharmaceutical Society's Laboratory, by permission of Professor Attfield.—*Phar. Jour. and Trans.*, Dec. 11, 1886, p. 468.

SOME PLANTS OF AFGHANISTAN, AND THEIR MEDICINAL PRODUCTS.¹

By J. E. T. AITCHISON, C.I.E., F.R.S.,
Brigade Surgeon, Bengal Army.

During the month of August, 1884, I was appointed by his Excellency the Viceroy and Governor-General of India, the Marquis of

¹ Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, Wednesday, December 8, 1886.

Ripon, Naturalist with the Afghan Delimitation Commission. The British Commissioner, Sir Peter Lumsden, G.C.B., coming direct from England, joined the Indian portion of the mission in the vicinity of the proposed boundary. The party from India, commanded by Colonel—now Sir West—Ridgeway, left India in the end of August, Quetta on September 22, 1884, marched through northern Beluchistan to the Helmand, thence through Afghanistan to Khúsan, which was reached on November 18. During 1885 I travelled over a great extent of country in northern Afghanistan and Persia, finally left the mission on August 16, 1885, proceeding through Khorasán *viâ* Meshad and Astrabad to the Caspian, thence *viâ* Baku, Batoum and Constantinople to England.

In making my collections it was one of my principal aims to obtain those plants which yielded products of commercial value, and personally to collect from the living plant the product it yields, taking nothing for granted or on hearsay only, hoping thus to assist materially in elucidating the many diverse opinions held relative to the substances themselves, as well as to the plants that yield them. I also considered it of great importance to obtain good specimens for botanical identification, with seeds for cultivation, and when possible, the local names of the plant and product were noted. I need hardly tell you that this was but a fragment of my work, having brought to England some eight hundred species of dried plants, amounting in all probability to ten thousand specimens, in addition to my numerous zoological collections. Although the work was intensely interesting it was of necessity laborious, and the difficulties to be overcome were numerous, but now that I have begun to discover the value of the material amassed, these troubles and labors are well nigh forgotten.

The class of plants with their products, upon which I propose speaking to you first this evening, and in which I feel sure you will be most interested, is the *Umbelliferae* which form the characteristic vegetation of the region under consideration. The country in which these *Umbelliferae* flourish consists of the great shingle and conglomerate plains lying between the hills and the beds of the rivers, which are broken up by numerous ravines and traversed by what are usually dry water courses, which once in every two or three years, on the occurrence of heavy falls of snow on the hills above, or local showers of rain, suddenly become roaring torrents. The altitude of these plains above the sea level ranges from 2,000 to 4,000 feet. These

plains during winter are perfectly treeless, arid, and bare, the only signs of a past vegetation being the gnarled remains, scarcely over a foot in height, of a few shrubs. As one gazes on this desert-like country, extending on all sides, one wonders whether it could possibly produce even a blade of grass in summer. To make things worse, there is little or no water, which to the traveller is a matter of risk and difficulty, owing to the distances between the springs and the uncertainty of the supply. As summer advances a complete change comes over the scene; these bare plains become rapidly covered with a mass of splendid verdure produced chiefly by the presence of the following umbellifers, viz., *Ferula fetida*, Regel, *Dorema Ammoniacum*, Don, and *Ferula galbaniflua*, Boissier and Buhse. The two former usually occur associated together, whereas the latter is generally found alone. The habit of growth of these three species is much the same; they all produce a great show of foliage thrown out from their perennial root stocks. This foliage spreads out on the ground to nearly three feet, forming a circle round the base of the flowering stems, little under six feet in diameter, and it is the close approximation of the foliage of adjacent plants that gives to the country in which they grow its wonderful appearance of a never-ending pasturage. Upon each species throwing up its own peculiar form of inflorescence, the landscape becomes much altered, more especially with regard to the appearance presented by *Ferula galbaniflua*. When this is in full flower, with its golden-colored paniced inflorescence from three to four feet in height, representing a miniature forest, the sight is one to be dreamed of rather than believed in or described. This wonderful verdure lasts from the end of April to the beginning of July, by the end of that month it has as suddenly disappeared as it originated, even to the fruit-bearing stems. The hot sun dries the plants to a cinder, and the prevailing winds finish the work of destruction so thoroughly, that by August not a trace of the past season's vegetation is left.

Ferula fetida, Regel, syn. *Ferula Scorodosma*, Bent. and Trim.; *Scorodosma fetida*, Bunge.—The plate in Bentley and Trimen's 'Medicinal Plants' is a most excellent one of the plant in fruit. The native name for the asafetida plant near Herat is *Angúza-kéma*, *Kúrné-kéma*, *Khora-kéma*. *Kéma* may be considered the generic term for all the *Ferulas* and *Doremas*. *Anguza* is the term for the product asafetida, and is what in India is called "hing." This last name is also applied to it by traders in these parts.

In early spring great cabbage-like heads are to be seen distributed at intervals amongst the asafœtida plants. Their peculiar forms represent the primary stage of the flower heads, enclosed and completely covered up by the large sheathing stipules of its leaves. In a few days these heads become transformed into the semblance of a cauliflower; from this period the stem bearing the inflorescence rapidly shoots upwards to a height of from four to five feet, its proportions being singularly massive and pillar-like. From a general calculation I found that only one out of a hundred plants bore a flowering stem. If you ask a native what plant this is, pointing to a flower-bearing one, he will tell you that it is "*kurné-kéma*," and that it has nothing to do with the plants that yield asafœtida. He will take out his knife, remove the head, cut the stem from its base, strip off the few sheathing stipules that are still adherent to the stem, and in his hand you see what looks like a very large cucumber: from this he will remove the dark-green cuticle, and then slice away at the deliciously cool, soft, crisp, copiously milky stem, and eat slice after slice with the greatest gusto, and then say, "Did I not tell you it was the edible *kéma*, and not asafœtida?" "Yes," says an onlooker. "You will stink like a camel for the next three months!" The method of collecting the drug, as far as I could learn, was as follows: A few men, employed for the purpose by some capitalist at Herat, are sent to these asafœtida-bearing plains during June. These take with them provisions, consisting of flour, and several donkey-loads of water-melons, the latter in lieu of water, which is not only scarce there, but usually saline. The men begin their work by laying bare the root stock to a depth of a couple of inches of those plants only which have not as yet reached their flower-bearing stage. They then cut off a slice from the top of the root stock, from which at once a quantity of milky juice exudes, which my informant told me was not collected then. They next proceeded to cover over the root by means of a domed structure, of from six to eight inches in height, called a *khora*, formed of twigs and covered with clay, leaving an opening towards the north, thus protecting the exposed roots from the rays of the sun. The drug collectors return in about five or six weeks' time, and it was at this stage that the process of collecting came under my personal observation. A thick gummy, not milky, reddish substance now appeared in more or less irregular lumps upon the exposed surface of the roots, which looked to me exactly like the ordinary asafœtida of commerce, as

employed in medicine. This was scraped off with a piece of iron hoop, or removed along with a slice of the root, and at once placed in a leather bag, the tanned skin of a kid or goat. My guide informed me that occasionally the plant was operated upon in this manner more than once in the season. The asafœtida was then conveyed to Herat, where it usually underwent the process of adulteration with a red clay *tûwah*, and where it was sold to certain export traders, called *Kâkri-log*, who convey it to India. On August 17, when I crossed the great asafœtida plains where this drug is chiefly collected, except for the small domes over each root, there was not a leaf or a stem or anything left to point to the fact that any such plant had ever existed there, the heat and winds of July and August having removed every trace.

In northern Beluchistan, after much difficulty and searching, I came across one root of asafœtida, which I believe belonged to a different species; but I did not see a single stem, or even the remains of one, although we traversed immense plains upon which these fragments of leaves still existed, and where, I believe, during summer the plant must have grown in abundance.

Dorema Ammoniacum, Don.—This is the *Kandal-kéma* of Afghanistan, or, in other words, the *kéma* that yields the product *Kandal*, and which appears to me to be ammoniacum. As already stated, this grows along with asafœtida, *Ferula fœtida*, Regel. It is equally abundant with the latter, and occupies similar localities, having much the same habit. When these two plants have produced their base leaves only, it is almost impossible for any one to distinguish between them, and both, on injury, yield a milky juice. On the flowering stem beginning to shoot, the *Dorema* is readily recognized, as the immature flower head shoots forth uncovered by any sheathing stipules, and in the form of a panicle, with the peduncles not spreading from the main stem. As the stem becomes fully matured, one-sided nodes form on it at irregular distances, which give to it an undulating appearance characteristic of the plant. The plate of this plant in the 'Memoirs of the Imperial Academy of Science at St. Petersburg,' by Borszczoff, is excellent, though the peculiar enlargements on the stem are not sufficiently indicated. When it has reached its fruiting condition, it is very liable to be attacked by a boring insect, especially in the fruiting heads, the result of which is the rapid escape of a large amount of a milky fluid, which, upon exposure, soon becomes tenacious and gummy, forming into solid concrete lumps of a grayish

opalescent color. This substance in these parts is the *Kandal* or *Ushak* of commerce. It is collected simply by removing the lumps from the surface of the plant, or, if later in the season, from the ground. No means are taken to increase the flow of fluid from the stem artificially. Between Bezd and Shér-i-nao a large quantity of *Kandal* grows, and it is there gathered for exportation.

I may mention here that *Dorema glabrum*, which attains a height of from ten to twelve feet, grows in great abundance, along with tamarisk, in the Nehal shéni portion of the Badghis territory, forming thickets in the stream beds. It yields a gum-resin. I also collected a very distinct new species of a *Dorema* with foliage resembling *Ferula fœtida*.

Ferula galbaniflua, Boissier and Buhse.—The plate of this in Bentley and Trimen is not sufficient, owing to the imperfect material they had to work with. Our plant differs from Boissier's description, in having a perfectly hollow stem and woolly petals; but this woolliness so entirely disappears in the herbarium, that unless seen originally one would doubt its having ever existed. Notwithstanding these discrepancies, we have no doubt that it is *F. galbaniflua*, Boiss. et Buhse. The native name for this plant is *Brada-kéma*. In habit it differs from the two already described species, in growing gregariously, and in its being found in greatest luxuriance in moister localities, as in the Badghis near Gulran, where it grows in the sandy loam of that district. Its early root leaves spring from the ground like a fountain of soft green moss, and in this state it is greedily devoured by camels. The stem, which grows very rapidly, is of a semi-opalescent orange color when young and perfectly glabrous. When in full blossom the flower is of a brilliant orange-yellow; as the fruit forms and ripens the color changes from the base of the plant upwards, showing various autumnal tints. The stem is thick at the base but tapers suddenly upwards, terminating in an elegant tall, loose, paniced inflorescence, reaching a height of about four feet. The stem, on injury, from its earliest stage of growth, yields an orange-yellow gummy fluid, which very slowly consolidates, usually forming on the stem, like the grease on a guttering candle, and possessing in common with the whole plant when crushed a strong odor resembling that of celery. The gum is commonly found adhering to the lower portions of the stem, and is so tenacious that when subsequently examined pieces of the plant are frequently found attached to it. This

substance is called by the natives *Shilm-i-badra-kéma*, *Shilm-i-barzat*, *Birzand-Jao-shír*. No artificial means are employed to my knowledge in the collection of this drug. It is stated to be an article of export through Persia *viâ* the Gulf to Arabia and India. In Persia and Afghanistan it is said to be administered to parturient women, and the entire shrub is hung round the house to keep off evil spirits whilst parturition is actually taking place.

Ferula suareolens, Aitch. and Hemsley, *sp. nov.* This is a new species of *Ferula* that comes under the division *Euryangium*. It is a plant from three to four feet in height, and grows, at an altitude above 5,000 feet in the hills to the south of Bêzd. The root of the plant, called *Sambal*, is scented, and is collected and exported from Turbat-i-Haidri, through Persia, to the coast. The shrub itself is called *Kéma*, but so are all these large Umbellifere. It has a solid stem, with nodes on it much resembling those of *Dorema Ammoniacum*, and also yields some form of gum-resin, which, however, I was unable to collect.

Trachydium Lehmanii, Bth. and Hooker, syn., *Eremodaucus Lehmanii*, Bunge, and *Albertia margaritifera*, Regel and Schmalh.—The roots of this species are not thicker than a goose quill, and from three to four inches long, tapering off to a point. They are collected as a drug under the name *Shúkh-akhal*, and exported from Herat. It is curious to note that generally on the central flower of the umbel there is a piece of gummy rose-red exudation, the result of injury by an insect.

Psammogeton setifolium, Boiss.—The fruit of this plant is largely collected and employed as an aromatic stomachic in Persia; it is a very common annual, generally met with over the whole country.

I would now proceed to draw your attention to the several kinds of manna, and their sources, which are produced in this country. There are three kinds which are usually met with, and which form articles of export. The first, and that most largely exported, is an exudation that occurs in certain seasons and years upon *Cotoneaster nummularia*, Fisch. et Mey. The plant is called *Siah-chob* (black stick) and the manna *Shir-kisht*, meaning hardened milk. This cotton-caster is a tall stout shrub, growing occasionally to twelve or fourteen feet in height. It is met with throughout the Paropamisus range and in Khorasán, at an altitude of about 5,000 feet. Although common everywhere in these hills it is found in greater abundance on the Siah-

koh and Saféd-koh and the Ar-dewán pass, forming regular thickets; these are also the noted localities for obtaining the manna. During July, as the corn ripens, the smaller branches of the cotoneaster become covered with the exudation, and this is collected by merely shaking the branches over a cloth. It is eaten largely by the people as a sweetmeat, and exported in quantity to Persia and India.

The second kind of manna is that yielded by the camel-thorn, *Alhagi Camelorum*, Fisch. This is a thorny shrub of from two to three feet in height, growing generally over the country at an altitude of two thousand feet, very frequently gregarious, forming a dense shrub. In certain years, during the months of July and August, this manna is developed on the branches of the camel-thorn (*Shutar-khár*), or goat's-thorn (*Khár-i-bázi*). The manna is called *Taranjabin*, which means the honey from the green (bush), this name probably originating from the shrub remaining vividly green over the country long after all other plants have dried up and disappeared. The country round Rui-khauf, in Persia, is celebrated for this product, whence it is exported in all directions.

The third kind of manna is that yielded by *Tamarix gallica*, Linn., var. *mannifera*. I collected specimens of this plant in the Badghis, where it was pointed out to me by a Persian as being the shrub that in Khairan Persia yielded *Gaz-shakar*. The plant in Afghanistan is called *Gaz*, and the manna it yields *Gaz-anjabin*; the latter I did not find.

At Sha-Ishmael, on October 8, 1884, I collected a quantity of manna in the form of milk drops from the foliage of *Salsola fetida*, Del. It was pleasant to the taste, with a slightly aromatic flavor. This, I regret to say, has been lost.

Glycyrrhiza glabra, Linn., and its variety *glandulifera*, Reg. et Herd.—This shrub in one form or other is very common all over the Badghis, and throughout the Hari-rúd and Khorasán districts, near water. Its annual stems grow to great coarse shoots of from four to five feet in height from enormous underground root stocks. The Turkomans prepare from its roots the extract liquorice, which as well as the shrub they call *Mahk*. The Persians call the plant *Sús*, the root *Behk-sús*, and the extract *Rob-i-sus*. Liquorice is not manufactured at Meshad, but I was told that it was imported from Yezd and Fars in Persia, as well as from Turkistan. I obtained a preparation of it made by boiling the extract down in whey, which gives it a

saline flavor, making the liquorice more palatable. This preparation is called by Turkomans *Äo-karüt*, the same term as they apply to whey.

Astragalus heratensis, Bunge, and *Astragalus* sp. near *A. strobiliferus*, Royle.—These two species of *Astragalus* are very common in stony soil in the Hari-rúd valley and Khorasán, at an altitude of three thousand feet. The native names for either of these were *Khon*, *Kon* and *Gabina*, and for a gum that exudes from them *Katira*. This gum was found attached to the stem in the peculiar form of tragacanth, wherever it had been able to make its way out through fissures in the bark, and on cutting the stem across the gum was seen to protrude from the medullary space. It is collected in large quantities in the neighborhood of a village called *Kalla-roving*, near Bezd, in Khorasán, for exportation to India *viâ* Herat, and to the sea coast of Persia.

Rheum sp. near *R. songaricum*, Schrenk.—I found a very handsome species of rhubarb on the great plains in the Hari-rúd valley, near Tomanagha, at an altitude of two thousand feet; this the natives call *Rewash-i-déwana*, viz., fool's rhubarb, *Rewand-i-méghan*, *Ishkin*. It is very peculiar in its growth, producing three enormous basal leaves, which spread out flat on the ground, each being about four feet long by five feet across, and the flowering stem with a loose spreading panicle of flowers reaches a height of about three feet; the fruit is large and winged, ripening to a ruby red. The ripe fruit is collected and employed as a purgative, and when not procurable, the root is substituted. I am glad to say that I have been able to obtain a large quantity of the seed, which has been distributed to several gardens; some plants have already sprung up, and are doing well in the gardens at Kew.

Orchis laxiflora, Linn., and *Orchis latifolia*, Linn.—I obtained the two species of orchis in a few localities in the Badghis, the Hari-rúd valley, and Khorasán, and near Meshad I came across people digging for the tubers of these orchids, which they called "*sálab*" and "*sálap*."

In several places where I had purchased the dry tubers I was told by the vendor that they were not procurable in Afghanistan, but only near Meshad. There can now be no doubt from my identifications on the spot that the tubers generally exported from Meshad into India through Afghanistan are those of the above species. In Meshad I was informed that these were *Sálap*, but not *Sálap-misri*; that the

latter was an import article from Egypt, specimens of which, I regret to say, I was unable to procure.

Microhynchus spinosus, Benth.—Native name *Chir-kah*.—This is a small shrub from one to two feet in height, with numerous intricately twisted branches, interlaced so as to give the shrub the form of a ball. It is apparently leafless, and very much resembles *Lactuca orientalis*, but has thicker and more fleshy branches without spines; both grow in the same stony gravel, especially on limestone débris. This plant yields a milky juice, which exudes from injury, and dries in small grayish-black pieces, irregular in form, the largest the size of a pea. This is collected and sold under the name of false *Anzérút*, or *Anzrúd*, and has the most nauseous and offensive odor of any substance that I have ever come across. The native who showed me this product said he knew the true *Anzérút*, or Sarcocolla drug, quite well; that it was collected from somewhat similar bushes by shaking them over a cloth, and that these bushes were common near Koin, Birjand, and Yezd, in Persia, and were called *Chir-kah* and *Shai-a-kah*.

A true pine resin, also called *Anzérút*, is imported into Meshad from India.

Delphinium Zalil, Aitch. and Hemsley, *nov. sp.*—This plant is found in great luxuriance at an altitude of 3,000 feet in the moister localities of the Badghis and Khorasán, and is called by the natives *Zalil*, also *Isparak*, *Isburg*, *Aswarg*. The flowers, which, when fresh, are of a brilliant yellow, are employed in native medicine as a tonic and alterative, but are usually exported from Persia and Afghanistan as a dyestuff.

Papaver somniferum, Linn.—The opium poppy is cultivated in Khorasán, where the inhabitants both eat and smoke it. The quantity produced is chiefly consumed in the country itself, a little being exported westwards through Persia, and some towards Turkistan. In Afghanistan it is but little cultivated, and scarcely used.

Merendera persica, Boiss.—This spring flower is extremely common throughout Afghanistan and Persia. The corms of this species, with their external coverings removed, were sold at Meshad as *Shambalit*, one of the kinds of *Hermodactylus*, and which may be occasionally mixed with the corms of *Colchicum speciosum*, Stev., also a common plant in those parts. This is exported from Persia to India by the Persian Gulf to Bombay, rarely through Afghanistan.

The *Surinján* of the Punjab, which may also be another form of the

Hermodactylus of the ancients, and which is imported into the Punjab from Kashmir, is without doubt the corms of *Colchicum luteum*, Baker. This is very common on the passes in Kashmir, extending as far west as the Murree Hills to Abbotabad, and has even been collected at as low an altitude as Lawrencepur. The corms of *Colchicum luteum* may be occasionally adulterated with those of *Marendera Aitchisonii*, Hook. fil., which I now believe is a variety of *M. persica*, and which is very common throughout the salt range extending to Kashmir.—*Phar. Jour. and Trans.*, Dec. 11, 1886, p. 465.

MINUTE OF THE COLLEGE.

PHILADELPHIA, December 27, 1886.

A stated meeting of the members of the College of Pharmacy was held this day at the usual hour, in the hall, Chas. Bullock presiding. Fourteen members present. The minute of the last regular meeting, September 27th, was read, accepted as a correct record, and adopted. The minutes of the Board of Trustees for the months of October, November and December, were read by the acting Secretary, and on motion, approved.

Under the consideration of general business, an interchange of views arose upon the propriety of a more strict application of the conditions imposed upon resigning members in Article XVI, Chapter 8, of the By-laws of the College. The article reads, in part, as follows: "No resignation shall be received from any active member of the College, unless the same be accompanied by a voucher that his certificate has been returned, or destroyed, and all arrearages paid."

Instances of non-compliance with these terms led to a generally expressed sense of the members that, hereafter resignations will be withheld from official action until satisfactorily endorsed by the Treasurer.

As a topic of common and increasing interest, the consideration of educational advancement, as indicated in the proceedings of the Inter-Colonial Pharmaceutical Conference, held at Melbourne, Australia, in October last, was brought to the attention of the members by Prof. Maisch. Reference was made to the practical operation of the two main points, or features, namely, that of "securing a uniform system and standard of education, throughout Britain and her Colonies," and of "making certificates of attestation interchangeable." A diversity of opinion was expressed upon the feasibility of including America in the application of such system. Some members viewed such as the probable purpose and object of the movement—others dissenting from this impression. It was thought, however, that a more explicit understanding of the whole subject would result from the comment and discussion, which it will receive in the columns of the various periodicals. One other important subject develops in the deliberations of the Conference, namely, the consider-

ation of the "duration, or period of apprenticeship," the disposition of all governing bodies, except upon the Continent, being to require *four* years of *actual* service and application, as the minimum term sufficient.

No other business being brought before the meeting, a motion of adjournment prevailed.

WILLIAM B. THOMPSON,
 Secretary.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, December 21, 1886.

The third of the present series of Pharmaceutical Meetings was held this day, Mr. Robert England being chosen chairman.

The minutes of the last meeting were read, and there being no corrections required, they were approved.

The actuary presented to the library from Dr. A. B. Lyons, the author, a treatise on pharmaceutical assaying, designed especially for the use of the student and of the practical pharmacist. The thanks of the College were directed to be returned by the registrar.

Specimens of the sands thrown up from the geysers during the earthquake near Charleston, S. C., in August last, were presented by Mr. G. J. Lubn. Hand-some specimens of chrome iron ore, brought from Taxit, Syria, were presented to the cabinet.

Two varieties of fustic were presented by Mr. Palmer, chemist for J. M. Sharpless & Co. They are known as Tampico and Corinto, and show the coloring matter, a calcium salt, deposited in the cavities of the wood. The thanks of the meeting were tendered to the givers for these specimens.

Papers being called for, Mr. Meyers read one on the *sulphur industry of the west*, which elicited some conversation respecting the sulphur deposits of different countries. The paper was, on motion, referred to the committee on publication.

Mr. Bullock read a paper upon *artificial oil of wintergreen*, and exhibited the results of a series of experiments made by George W. Beringer, Ph. G. The paper was referred to the committee on publication.

Mr. Bullock also read a paper upon *oil of sassafras*. Prof. Trimble asked if any oil of camphor had been detected in any specimens, to which reply was made that it had not been so examined, but that it would be well to have such a test made. This paper was also referred to the publication committee. Prof. Trimble's remark gave rise to a query regarding the uses to which the oil of camphor is put, as there have been about 125,000 pounds imported into the country; but it seems that its use has not been traced thus far.

Mr. Joseph W. England read a paper on *subiodide of bismuth*, a preparation which has been growing into use for some time past, to be employed in place of iodoform, having similar remedial properties and being free from the disgusting odor of the latter. Prof. Maisch inquired if the yellow subiodide was a true iodide or a mixture of the subiodide with another salt. The reply was

that about 10 per cent. was subiodide. On motion the paper was referred to the publication committee.

The actuary read a short paper upon the *change of color noticed in a mixture* composed of syrup of wild cherry bark, syrup of squill, morphine acetate and sweet spirit of nitre.

After a short conversation the meeting, on motion, adjourned.

T. S. WIEGAND,
Registrar.

EDITORIAL DEPARTMENT.

Pharmaceutical Education.—Nearly twenty years ago the first practical steps for pharmaceutical legislation in the United States were inaugurated, through a resolution offered by Dr. Squibb before the American Pharmaceutical Association. The late John Milhau, who was then President of the Association, had previously interested himself in favor of such a measure, as far as the city and state of New York were concerned. In the following year, 1868, a report was made to the Association, giving all the laws relating to pharmacy, then on the statute books of the different States; and in 1869, the draft of a law was reported, and subsequently communicated to the governor and legislature of each state. This proposed law aimed in an indirect manner, to secure, aside from the requisite practical experience, the proper education of the young pharmacists. In the laws which have been enacted since, this last mentioned aim has been more or less lost sight of, even in those States where higher educational institutions are maintained, at which the expenses for tuition are of mere nominal amount. It is true, that some of the laws recognize directly the value of systematized education in addition to shop practice; but in no single instance is the former required. Modelled after the British law, but without the prerequisite of the latter—education prior to apprenticeship—our pharmacy laws are necessarily to that extent less efficient, than that of Great Britain.

It is but natural that the pharmacy acts in force in the different colonies of Great Britain should be framed after that of the mother country. In the Australian colonies, Tasmania began the regulation of the practice of pharmacy as early as 1842, when a board of medical examiners was created for the purpose of testing, by examination, the qualification of those intending to embark in business as a pharmaceutical chemist. The other colonies followed with enactments; but the pharmacy boards are composed of pharmacists, two of the Queensland Board being medical men, but registered pharmaceutical chemists of Great Britain, and in New South Wales the board is composed of seven pharmacists and two physicians. These boards are examiners, but they have encouraged the establishment of Colleges of Pharmacy, of which several are in existence. With the view of harmonizing pharmaceutical education in Australia, an intercolonial conference was held in Melbourne, October 27, 28 and 29, of 1886, at which representatives of the pharmaceutical societies and examining boards of the different colonies were present, namely: three from New South Wales, two each from New Zealand, South Australia, Tasmania and Victoria, and one from Queensland.

The deliberations of this conference, as published in the *Chemist and Druggist of Australia*, and in the *Australasian Journal of Pharmacy*, were characterized by the evident desire of elevating pharmacy, and placing it in all the colonies upon such a basis, that there shall be no essential difference in the qualifications exacted in each. These objects are to be accomplished, by insisting upon a good education *prior to apprenticeship*, upon an apprenticeship of four years upon a systematic course of study in the essential branches, and finally by written, oral and practical examinations. The delegates were unanimous on nearly all points, including the details, and appeared to have no doubt that the essential features of the plan would be adopted by the different legislatures. As soon as this is accomplished, the certificates of qualification will be mutually recognized, and it has been urged that they also be recognized in Great Britain; the hope was even expressed that they would ultimately be exchangeable with France and Germany. Although the colonies recognize the French diploma of "pharmacien" and the German certificate of "State's Examination," there is no likelihood of reciprocity being secured with the two countries named, or with any other of continental Europe, for many years to come; and even in Great Britain a modification of the Pharmacy Act seems to be necessary before the object sought can be attained. It is rather significant that in this particular respect no allusion was made to the reciprocity with other British colonies, or with Canada or the United States. As far as our country is concerned this is probably due to the heterogenous legislation, and the total absence of compulsory pharmaceutical education and of uniformity of qualification, demanded under our laws. For the present it seems more likely that proof of attendance at a full course in a reputable college in this country may be accepted as complying with the required course of study, than that American certificates of qualification issued under our pharmacy laws may be regarded as the equivalent of Australasian certificates.

In directing special attention to the proposed Intercolonial Pharmaceutical Council, we append here the resolutions adopted by the conference. They are as follows:

I. That a uniform system of education is desirable, such system to embrace—

- (A) Preliminary Examination to include the same subjects as required by the Pharmaceutical Society of Great Britain, to be passed prior to apprenticeship; but if the candidate produces and lodges with the registrar a certificate, that he has at the matriculation examination by some university, college or school recognized by the Board, passed in the above or corresponding subjects, he shall not be required to pass this examination.
- (B) Apprenticeship of four years.
- (C) Course of study, based upon the course adopted by the Pharmaceutical Society of Great Britain.
- (D) Examinations, to be conducted by examiners appointed by boards, councils, or governing body.
 - (1) The mode of conducting examinations to be both written and oral in every subject, the oral to be at the discretion of the various boards and societies.

All candidates for the qualifying examination shall have reached the full age of twenty-one years.

- (2) The subjects of examinations to embrace Botany, Materia Medica, Chemistry, and Practical Chemistry, to be conducted, as far as practicable, in conformity with the practice in Great Britain; and Practical Pharmacy conducted as in Victoria, each candidate to obtain not less than 50 per cent. in dispensing.
- II. That uniformity in Australasian Pharmaceutical Legislation is desirable. That in the interpretation clause of the various acts of the various colonies the name of the colony be omitted.
- That clause 10 of the amended Pharmacy Act of Victoria, or words of similar import be adopted by this conference.¹
- III. That uniformity in the laws relating to the sale and use of poisons and the regulations for their custody is desirable, where practicable.
- That a Poisons Bill be drafted by the various pharmaceutical bodies of Australasia, and circulated in all the colonies for discussion, and on its adoption that steps be taken to obtain its further adoption by the respective legislatures.
- IV. That, on adopting and giving effect to resolution I., the Examination Certificates shall be recognized by the Governing Bodies of the various colonies.
- V. That it be a request to the Registrars of the Australasian Pharmacy Boards or Councils to forward copies of the examination papers to each board.
- VI. That copies of the resolutions adopted by this Conference be forwarded to the Colonial Secretaries of each of the colonies here represented, with a request that legislative power be given effect to in accordance with these resolutions.
- VII. That the results of this Conference be transmitted to the Pharmaceutical Society of Great Britain with a request that interchange of certificates be considered.
- VIII. That it is most desirable that an Intercolonial Pharmaceutical Council should be established, such Council to visit and hold meetings in rotation in the various colonies of Australasia to discuss and consider questions relating to intercolonial pharmaceutical subjects.
- IX. That the rapid increase in the trade of proprietary medicines and secret nostrums is antagonistic to the true interest of pharmacy.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Drugs and Digestion. By Robert G. Eccles, M. D., 12mo.. pp. 26.
Reprint from the *New York Medical Journal*.

Sur les Urines sucrées, (on urines containing sugar).

Sur une forme rare de graviers d'oxalate de chaux, (on a rare form of gravel of calcium oxalate.)

These two essays are by Dr. C. Méhu, pharmacist of the Paris Charité, and are reprints from *Annales des Maladies des Organes génito-urinaires*.

¹ The clause referred to is as follows—The Board shall from time to time cause the names of all persons certified by the Board to be registered.

Annual Report of the Commissioner of Pensions, for the year ended June 30, 1886, Washington, D. C., Svo., pp. 70.

The Physician's Visiting List for 1887. Philadelphia. P. Blakiston & Co.

This is the thirty-sixth year of the publication of this visiting list; it is issued in different sizes and styles varying in price from \$1 to \$3.

Manual for the use of Boards of Health of Massachusetts, containing the statutes relating to the public health and the decisions of the Supreme Court of Massachusetts relating to the same. Prepared by direction of the State Board of Health, Boston: Wight & Potter, State Printers, 1886. Svo. pp. 117.

OBITUARY.

Julius Wilhelm Albert Wigand, Ph.D., Professor of Botany at the University of Marburg, and director of the botanical garden and of the pharmacognostic institute at that university, died in Marburg, October 22, 1886, aged 65 years, 6 months. He was the second son of Dr. Frederick Wigand, apothecary in Treysa, Hesse-Cassel, was educated at the classical school in Marburg, studied at the university in the same city natural sciences, mathematics and philology, and graduated there in 1846. After continuing his studies in Berlin and under Schleiden in Jena, he qualified in Marburg as teacher (Privatdocent) of botany, August 29, 1849, became extraordinary professor March 27, 1851, and after Wenderoth's death, ordinary professor of botany December 11, 1861. Aside from his numerous contributions to botanical science, which are scattered in various journals, he published, 1874-77, a work on Darwinism in three volumes; also a valuable work on Pharmacognosy and a Flora of Hessa (Electorate) both of which passed through several editions.

Louis Mialhe, formerly Professor on the Paris Ecole de Médecine, died in Paris. November 1, 1886, in the 80th year of his age. The deceased was in business in Paris as a pharmacist, and had also studied medicine. He wrote numerous essays on pharmaceutical and toxicological subjects, and was one of the editors of the *Journal de Pharmacie et de Chimie*. He was one of the honorary members of the Philadelphia College of Pharmacy.

The following graduates of this college died recently:

David L. Stackhouse, class 1854, died in Philadelphia, November 25, 1886, in the 54th year of his age. He was born in Bucks Co., Pa., learned the apothecary business with Thos. J. Husband, and subsequently went into business at Eighth and Green Streets.

Joseph Bloomfield Wetherill, class 1857, a native of Philadelphia, died in New York, December 6, 1886. After learning the drug business with Thos. P. James and conducting for some years a drug store in Memphis, Tenn., he went to New York to study theology, was afterwards connected with Episcopal Churches in Rome, Italy, and Newark, N. J., and with St. Paul's Church in New York, and finally was rector of St. Ambrose Church in that city.

Thomas R. Coombe, class 1859, of Chester, Pa., was an apprentice under Jas. N. Marks, and afterwards was engaged in business in West Philadelphia. Several years ago he disposed of his store and removed to Edgewater Park, N. J., where he died December 11, 1886.

CLASS OF THE PHILA. COLLEGE OF PHARMACY,

SIXTY-SIXTH ANNUAL SESSION, 1886-1887.

JUNIOR CLASS.

<i>Matriculates.</i>	<i>Town.</i>	<i>State.</i>	<i>Preceptor.</i>
Allwine, Jr., John, (Special)	Danville,	Pa.	S. Hayhurst, M. D.
Amerman, Ella,	Doylestown,	Pa.	L. Gerhart.
Angeny, Joseph Sleifer,	Germantown,	Pa.	R. Shoemaker & Co.
Bacon, Francis Llewellyn,	Germantown,	Pa.	R. Shoemaker & Co.
Bacon, William Warder,	Philada.,	Pa.	H. B. Taylor, Ph. G.
Baird, John,	Amsterdam,	N. Y.	C. G. A. Loder.
Baird, Robert,	Chester Co.,	Pa.	D. S. Jones.
Barrett, Charles Llewellyn,	Shawnee,	Ohio.	Chappalear & Bro.
Barrett, Walter Raphael,	Lykens,	Pa.	Brallier & Co.
Batdorff, Henry James,	Philada.,	Pa.	L. G. Bauer, M. D.
Baner, Louis Demmé,	Wheeling,	W. Va.	G. R. Scheehle.
Bayha, George Eugene,	Philada.,	Pa.	Edmund Beale, M. D.
Beale, Benjamin,	Philada.,	Pa.	W. R. Warner & Co.
Beatty, Eugene LaVere,	Elmira,	N. Y.	Kennedy & Burke.
Beckwith, James Webb,	Los Angeles,	Cal.	Davis & Whisler.
Bell, James Edgar Stevenson,	Haddonfield,	N. J.	R. Shoemaker & Co.
Bentley, David Fuller,	Philada.,	Pa.	Dr. John Tomlinson.
Berkau, Theo. Her. Arlington,	Reading,	Pa.	Drueding Bros.
Bickel, Milton Henry,	Felton,	Del.	M. M. Stevenson.
Bickel, Harry Lee,	Bellaire,	Ohio.	C. E. Hewitt & Co.
Bippus, Charles William,	Philada.,	Pa.	Bullock & Crenshaw.
Birch, Harry Reese,	Lock Haven,	Pa.	T. C. Felton & Co.
Blackburn, Robert Perry,	Lebanon,	Pa.	Edward R. Burdick.
Blouch, Charles Henry,	Tamaqua,	Pa.	John T. Bond.
Bond, Ira Linton,	Van Wert,	Ohio.	F. Jacoby, Jr.
Bonewitz, Orr Ray,	Bordentown,	N. J.	Wilson Cutter.
Bowen, Charles Alfred,	Middletown,	Pa.	J. W. Rewalt.
Bowers, Charles Edward,	Dayton,	Ohio.	W. A. Burns, M. D.
Breidenbach, Charles Henry,	Philada.,	Pa.	J. Howard Evans, M. D.
Brennan, John Thomas,	Philada.,	Pa.	S. Hayhurst, M. D.
Brensinger, Ellen C., M. D.,	Philada.,	Pa.	Bullock & Crenshaw.
Brick, Harry Walter,	Dubuque,	Iowa.	W. H. Torbert.
Brown, Charles James,	Crum Lynne,	Pa.	Chas. H. Roberts.
Buchanan, Frank,	Titusville,	Pa.	T. W. Reuting, Ph. G.
Butters, Charles Hayes,	Trenton,	N. J.	J. E. Cahill.
Cahill, Frank Joseph,	Philada.,	Pa.	L. W. Caldwell, M. D.
Caldwell, Florence Moore,	Zion,	Md.	F. P. Lins, Ph. G.
Cameron, Harrie Ross,	Bridgeville,	Del.	R. W. Cannon.
Cannon, Charles Walton,	Vincentown,	N. J.	W. B. Christine, M. D.
Carman, Frank Hamilton,	Port Carbon,	Pa.	W. Delker, M. D.
Cartwright, Benjamin Franklin,	Philada.,	Pa.	W. H. Pile & Son.
Cassidy, John Francis,	Chester,	Pa.	A. S. Buchanan.
Castle, Abraham Lincoln,	Lancaster,	Pa.	S. B. McCreery, M. D.
Charles, John Andrew,	Philada.,	Pa.	F. R. Gosling, Ph. G.
Christ, Frank Eugene,			

<i>Matriculates.</i>	<i>Town.</i>	<i>State.</i>	<i>Preceptor.</i>
Clapham, Benson Grant,	Mifflinburg,	Pa.	H. C. Clapham.
Clark, Gilbert F.,	Lansdale,	Pa.	F. G. Bigony, M. D.
Coale, Arthur Newton,	Havre de Grace,	Md.	E. A. Zeitler.
Codville, William Lowther,	Philada.,	Pa.	A. Tatem.
Coleman, Fred. Frelinghuysen,	Asbury Park,	N. J.	J. B. Moore, Ph. G.
Coley, Lemuel Belah,	Alexander City,	Ala.	A. J. Coley, M. D.
Collins, Thomas James,	South Oil City,	Pa.	Bullock & Crenshaw.
Cope, Frank Henry,	Philada.,	Pa.	Dr. William Auffurth.
Copeland, George Hogan,	Renovo,	Pa.	Hall & Brothers.
Cooper, Percival Valentine,	Media,	Pa.	W. E. Dickeson.
Crass, John Henry,	Bridgeton,	N. J.	C. H. Clark, Ph. G.
Crawford, Oscar,	Nazareth,	Pa.	Walter Crawford, Ph. G.
Cremer, Jacob Gruel,	Chambersburg,	Pa.	W. W. Moorhead, Ph. G.
Crumbie, George Joseph,	Philada.,	Pa.	D. Milligan, Ph. G.
Crutcher, William,	Nicholasville,	Ky.	J. Oxley, Ph. G.
Culin, Walter,	Moorestown,	N. J.	W. S. Reeve.
Dalton, Joseph Edwin,	Upland,	Pa.	O. P. Hooper.
Davenport, Benjamin Lincoln,	Shenandoah,	Pa.	R. England.
Davies, William Owen,	Slatington,	Pa.	J. A. Wiegner,
Davis, Clayton Erwin,	Florence,	Mass.	N. A. Davis.
Davis, Edward,	Minersville,	Pa.	D. R. Davis.
DeHaven, Samuel Robert,	Toledo,	Ohio.	A. Hertzman.
Demaree, Thomas Elliott,	Newport,	Pa.	W. C. Byers.
Demoville, James Louis,	Nashville,	Tenn.	Demoville & Co.
Devine, Oliver Crawford,	Philada.,	Pa.	Dr. McVicker.
Donaldson, Thomas,	Wilmington,	Del.	N. B. Danforth, Ph. G.
Dooling, Lewis,	Millville,	N. J.	Dr. T. C. Wheaton.
DuBois, Samuel Conier,	Philada.,	Pa.	J. F. O. Agthe.
Dyer, Charles Ellsworth,	Topeka,	Kan.	J. K. Jones.
Earle, George Wetherill, Jr.,	Wynnewood,	Pa.	E. C. Jones & Co.
Eisenhart, Edwin Kamerer,	Bingen,	Pa.	R. F. Babb.
Elfreth, Jr., Caleb Pierce,	Philada.,	Pa.	C. P. Elfreth.
Escott, Louis William,	Grand Rapids,	Mich.	E. B. Escott, dec'd.
Evans, William,	Philada.,	Pa.	A. L. Lamb.
Faries, Joseph Benjamin,	Smyrna,	Del.	S. P. Wright, Ph. G.
Feather, John Frank,	West Liberty,	Ohio.	R. M. Fulwider.
Fegley, Oscar George,	Pottsville,	Pa.	Dr. J. S. Ward.
Fink, Allen Jacob,	Hamburg,	Pa.	J. H. Stein, Ph. G.
Focht, Jacob Mauger,	Pottstown,	Pa.	H. B. Lippincott.
Fountain, Edward Jones,	Bryan,	Texas.	Stuart & Co.
Frantz, Will Lintner,	Lancaster,	Pa.	G. W. Hull.
Franz, Frederick William,	Sioux City,	Iowa.	F. Hansen.
Freeman, Clayton Lewis,	Freemansburg,	Pa.	O. J. Freeman.
French, Francis Freas,	Philada.,	Pa.	W. H. Koons, Ph. G.
Fretz, Mahlon Barnes,	Chalfonte,	Pa.	J. P. Slaughter.
Frizzell, George,	Henry Clay,	Del.	W. J. Stoner.
Froelich, Walter Scott,	York,	Pa.	W. H. Lewellyn, Ph. G.
Fruit, Will,	Hazleton,	Pa.	McClure & Co.
Furman, Frank Richard,	Hazleton,	Pa.	McNair & Hoagland.
Gallaher, Charles Sumner,	Neillsville,	Wis.	C. C. Sniteman, Ph. G.
Gardner, Orpheus Eugene,	York,	Pa.	
Gilbert, Thomas Henry,	Pulaski,	Tenn.	Sumter & Son.
Gill, Charles Alfred,	Hulmeville,	Pa.	Omar H. Musser, Ph. G.
Good, Wm. Franklin Preston,	Allentown,	Pa.	Hartzell & Co.
Goodyear, Andrew Kerr,	Philada.,	Pa.	P. Niskey.
Gould, Harry Zinn,	Carlisle,	Pa.	S. A. Haverstick.
Gracey, Archibald Alexander,	Philada.,	Pa.	J. E. Loughlin.
Graham, John Livingston,	Morton,	Pa.	E. C. Jones & Co.
Green, Philip Henry,	Reading,	Pa.	H. A. Borell, Ph. G.

<i>Matriculates.</i>	<i>Town.</i>	<i>State.</i>	<i>Preceptor.</i>
Greenfield, Oliver Roat,	Wilmington,	Del.	H. K. Watson.
Grossé, Gottlieb Matthew,	Cleveland,	Ohio.	W. F. Grossé.
Haak, Harry Clapp,	Pine Grove,	Pa.	J. B. Raser, Ph. G.
Hallowell, Bruce Clyde,	Frankford,	Pa.	G. S. R. Wright.
Hanson, Arthur Edward,	Philada.,	Pa.	
Harm, William John,	Columbia,	Pa.	Newbold Bros.
Hartel, Charles J. W.,	Washington,	D. C.	Camp's Pharmacy.
Hauck, Samuel Light,	Lebanon,	Pa.	E. R. Burdick.
Haussmann, Fred. William,	Philada.,	Pa.	Chris. Weiss.
Hazel, Thomas Harold,	Cressona,	Pa.	J. F. Lautenbacher.
Hebsacker, William Frederic,	Philada.,	Pa.	J. Wendel.
Hefley, Harry Baker,	Somer-et,	Pa.	E. & G. A. Fröh.
Hennesy, Sherman Francis,	Pottsville,	Pa.	C. H. Wagner.
Henry, Samuel Clement,	Jenkintown,	Pa.	J. W. Ridpath.
Hermany, Horace David,	Mahanoy City,	Pa.	D. P. Hermany.
Hess, James Monroe,	Bethlehem,	Pa.	H. A. Burkhardt.
Hibshman, Paul Robert,	Myerstown,	Pa.	A. S. Erney, M. D.
Hilliard, George B.,	Ackermanville,	Pa.	W. J. McClean.
Hinkson, William Elwood,	Chester,	Pa.	Charles E. Davis.
Hoch, Aquila,	Bushkill Centre,	Pa.	M. M. Buss, Ph. G.
Horn, Henry Morford,	Lone Pine,	Pa.	Wm. S. Mills, M. D.
Houck, Paul Winters,	Lebanon,	Pa.	F. Matthes, Ph. G.
Hume, Ward Dutcher,	Minneapolis,	Pa.	Robert McNeil.
Humma, Henry John,	Reading,	Pa.	Dr. C. S. Ermentrout.
Hunt, Gideon Shoop,	Danville,	Pa.	R. D. Magill.
Iobst, Frederick John,	Emaus,	Pa.	N. H. Kamerer.
Jacob, Charles Pim,	Limerick, Ireland.		G. C. Webster, Ph. G.
Jacobs, Eugene Jacob,	Atlanta	Ga.	Joe Jacobs, Ph. G.
Jacobs, Oliver Barron,	Ridgeville,	Del.	R. W. Cannon.
Johnson, Claude Grant,	Cumberland,	Md.	H. Lamey.
Johnson, Frank R.,	Chester,	Pa.	G. Banks Wilson.
Johnson, Frederick Leighton,	Cape May,	N. J.	H. A. Kennedy.
Johnson, Harry Eneu,	Philada.,	Pa.	Special.
Johnson, Jr., Joseph,	Trenton,	N. J.	A. G. Holcomb.
Johnson, Louis William,	Trenton,	N. J.	Rickey & Cook.
Johnson, Wm. Arthur Sterling,	Charlottstown, Canada,		Apothecaries Hall Co.
Johnson, William Britton,	Philada.,	Pa.	Bullock & Crenshaw.
Johnson, William H.,	Philada.,	Pa.	Special.
Jones, Lysander Mann,	Scranton,	Pa.	J. J. Davis, Ph. G.
Jones, Peter Laurence,	Jamestown,	N. Y.	Axel F. Johnson.
Jones, William Carrell,	New Egypt,	N. J.	J. Hurley Compton.
Jones, William Lincoln,	Catasauqua,	Pa.	W. Heckenberger.
Jump, Robert Burton,	Dover,	Del.	S. D. Marshall, M. D.
Kahnweiler, Levi,	Harrisburg,	Pa.	W. H. Egle & Co.
Kalteyer, William,	San Antonio,	Texas.	G. H. Kalteyer.
Kappes, Frederick Franklin,	Zanesville,	Ohio.	Nye Bros.
Keefer, Charles DeWalt,	Chambersburg,	Pa.	C. H. Cressler.
Keller, Augustus Herman,	Philada.,	Pa.	A. G. Keller.
Kennedy, Albert Dennis,	Philada.,	Pa.	S. H. Shingle.
Kern, Emil Julius,	Philada.,	Pa.	V. H. Smith & Co.
Kern, Morris Benjamin,	Tamaqua,	Pa.	H. L. Barber.
Kiger, Harry Stiles,	Wilmington,	Del.	H. C. Lintner.
Kitchen, Harry Allen,	Warren,	Pa.	Johnson & Siegfried.
Klopp, Peter Paul,	N. Heidleberg,	Pa.	N. Davis.
Koch, Eugene,	Philada.,	Pa.	L. Koch.
Kraemer, Henry,	Philada.,	Pa.	C. B. Lowe.
Krider, Richard C.,	Philada.,	Pa.	Stryker & Ogden.
Lammer, Henry Bruno,	Philada.,	Pa.	Bullock & Crenshaw.
Latta, James,	Wilson.	Kan.	D. W. Lillie.

<i>Matriculates.</i>	<i>Town.</i>	<i>State.</i>	<i>Preceptor</i>
Leach, Albert Edwin,	Lyons,	N. Y.	W. A. Hersey.
Leshner, Edwin Charles,	Kutztown,	Pa.	A. M. Steinmetz.
Lewis, Griffith Robert,	Catasauqua,	Pa.	E. D. Boyer, Ph. G.
Lewis, Lilbourn Galatin,	New Madrid,	Mo.	
Lippen, Harry,	Salem,	N. J.	H. M. Levering.
Lippincott, Ahab Haines,	Camden,	N. J.	E. S. Powers.
Livezey, John Bennett,	Doylestown,	Pa.	G. T. Harvey, M. D.
Livingood, Albert John,	Reading,	Pa.	John B. Raser, Ph. G.
Loucks, Charles Edward,	Ashland,	Ohio.	G. P. Harley.
Lupus, Herman Earnest,	Philada.,	Pa.	A. H. Weber.
Lyman, Robert Huntington,	Doylestown,	Pa.	Dr. Geo. T. Harvey.
Lynch, Albert James,	Woodstown,	Canada,	Garden Bros.
MacCollin, William Henry,	Philada.,	Pa.	Martin & Sommers.
MacCouch, Sam'l. Emlen,	Malvern	Pa.	Geo. R. Walton.
MacPherson, Frank Street,	Trenton,	N. J.	L. H. Street.
McCandless, Edward Sloan,	Philada.,	Pa.	W. H. Carslake.
McClellan, Leslie Corwin,	Utica,	Ohio.	
McClure, Berthier,	Milton,	Pa.	
McCouch, John,	Philada.,	Pa.	
McDowell, Charlie Hunt,	Lambertville,	N. J.	S. W. Cochran.
McIntosh, John R.,	Galion,	Ohio.	B. N. Bethel.
McVay, James Patrick,	Philada.,	Pa.	F. E. Morgan.
Macartney, Frank Hamilton,	Berwyck,	Pa.	Grove & Kesner.
Madeira, Robt. Wesley,	Shoemakerville,	Pa.	J. B. Raser, Ph. G.
Masholder, Harry Jacob,	Philada.,	Pa.	V. H. Smith & Co.
Meissner, Frederick William,	Laporte,	Ind.	Eliel Sons.
Meyers, Harry Joseph,	Bethlehem,	Pa.	E. T. Meyers.
Miles, Charles John Austen,	Manchester,	N. J.	R. W. Cuthbert, Ph. G.
Millett, Martin Edward,	Philada.,	Pa.	Bullock & Crenshaw.
Moffett, John,	Philada.,	Pa.	John Moffett.
Moor, Jr., Edward,	Media,	Pa.	R. T. Grime.
Moore, Frank Guthrie,	Cochranstown,	Pa.	
Moore, Milton,	Terre Haute,	Ind.	Bullock & Crenshaw.
Morgan, George Irving,	Lynn,	Mass.	F. E. Morgan.
Morrison, John Lewis Dale,	Camden,	N. J.	H. W. Miller.
Moss, William,	Akron,	Ohio.	Case & Schambs.
Myers, Harry Coffinberry,	Cleveland,	Ohio.	Benton Myers & Co.
Muir, Clarence Frick,	Lock Haven,	Pa.	E. S. Muir.
Mumma, Frank Gerson,	Mechanicsburg,	Pa.	Dr. J. H. Boyer.
Münster, Wm. Christian,	Evansville,	Ind.	W. F. Spencer.
Murray, Harry Louis,	McAlistersville,	Pa.	J. C. Weidman.
Murray, Thomas Francis,	Bryn Mawr,	Pa.	S. F. Stadelman.
Musgrave, Aaron Wallace,	Welliversville,	Pa.	L. E. Sayre & Co.
Neill, Charles Bodine,	Woodbury,	N. J.	A. S. Marshall, Ph. G.
Neiffer, Solomon Harvey,	Wiconisco,	Pa.	C. D. Christman, M.D.
Neville, William,	Conshohocken,	Pa.	Jas. W. Harry.
Nichols, John Baugh,	Philada.,	Pa.	W. R. Warner & Co.
Nolte, Henry Augustus Selle,	Swedesboro.	N. J.	C. C. Hughes.
Nowell, Edward Hewitt,	Ravenswood,	W. Va.	J. W. Denoon.
Oerter, Albert Eugene,	Bethlehem,	Pa.	Dr. Julian Fajans.
Offutt, Albert Lee,	Paris,	Ky.	H. B. Spackman.
Ogden, Charles Sheppard,	Camden,	N. J.	W. F. Richards, Ph.G.
Orr, James Parson,	Philada.,	Pa.	Geo. Holland.
Osborn, Daniel Cargill,	Starrucca,	Pa.	J. E. Farrell & Co.
Outcalt, Richard Stultz,	Hightstown,	N. J.	H. G. Roop.
Outen, Albert Petit,	Philada.,	Pa.	W. R. Warner & Co.
Palen, Joseph Alphonse,	Dubuque,	Iowa.	G. F. Thorman.
Peters, George Fezley,	Mauch Chunk,	Pa.	Joseph Lacier.
Pfund, Harry,	Philada.,	Pa.	J. A. Martin, Ph. G.

<i>Matriculates.</i>	<i>Town.</i>	<i>State.</i>	<i>Preceptor.</i>
Pickett, Charles Torbert,	New Hope,	Pa.	F. W. Throp.
Pierce, William Abner,	West Chester,	Pa.	Thos. G. Pierce.
Poppenhusen, H. Aug. Chas. Jr.,	Washington,	Mo.	C. Werckshagen.
Pringle, Jr., James Maxwell,	Charleston,	S. C.	L. A. Podolski.
Pryor, Wm. Brooks Thomas,	Langhorne,	Pa.	Dr. P. M. Minster.
Qualman, Chas. Christopher,	Peoria,	Ill.	W. M. Benton, Ph. G.
Quay, Frank Oscar,	Harrisburg,	Pa.	A. & F. Green.
Quigley, Richard Lucian,	York,	Pa.	T. B. L. Quigley.
Rabenau, John Herman,	Pottsville,	Pa.	H. Rabenau.
Ratcliff, William A. Walter,	Covington,	Ohio.	F. Alden Tift, Ph. G.
Rawling, Wilbur Fish,	Dover,	Del.	Givin & Co.
Read, Harry,	Philada.,	Pa.	
Reck, Charles Lincoln,	Greenville,	Ohio.	
Reed, Howard,	Doylestown,	Pa. C. A. Weidemann, Ph. G., M.D.	
Reig, Eugene George,	Warren,	Pa.	L. G. Moyer.
Reith, Emil,	Philada.,	Pa.	C. Petzelt.
Richard, Howard Newton,	Trenton,	N. J.	Irving W. Kelly.
Roberts, Lee,	Cambridge,	Pa.	T. H. Williams, M. D.
Roehrig, Albert Henry,	Pottsville,	Pa.	G. F. Roehrig.
Rogers, Harry Wheaton,	Haddonfield,	N. J.	E. Willard.
Rohm, Peter Simon,	Easton,	Pa.	C. Jacoby.
Rossberg, Gustave Adolph,	La Crosse,	Wis.	Weston & Simon.
Rosenkranz, Cyrill Depue,	Fairdale,	Pa.	J. T. Shinn.
Roth, Sam'l George Jeremiah,	Laury's,	Pa.	A. Weber.
Rourke, Michael,	Reading,	Pa.	J. A. Gingrich,
Ryan, David Stephen,	Scranton,	Pa.	Dr. Douglass.
Sangston, James Allen,	Wilmingon,	Del.	G. Williams.
Schimmell, John,	Trenton,	N. J.	G. A. Walker.
Schlaepfer, August James,	Evansville,	Ind.	H. J. Schlaepfer.
Schlesselman, John Henry,	Philada.,	Pa.	C. H. Hæntze.
Schlieff, William, Jr.,	Milwaukee,	Wis.	Aschenbach & Miller.
Schminky, Allen Beecher,	Lykens,	Pa.	A. G. Stanbury.
Schmitt, Herman Thad. Stevens,	Philada.,	Pa.	V. H. Smith & Co.
Schneider, John,	Philada.,	Pa.	M. D. Streeter, Ph. G.
Schroeter, Herman John M.,	Watertown,	Wis.	R. H. Brennecke.
Seasholtz, John Clay,	Sunbury,	Pa.	Dr. Butt.
Seiffert, John Henry,	York,	Pa.	Wm. Smith & Co.
Shugar, William Grant,	Lebanon,	Pa.	W. L. Deninger.
Simons, Robert,	Philada.,	Pa.	W. R. Warner & Co.
Sitgreaves, Wesley Cline,	Vincentown,	N. J.	F. Sanderson.
Skeath, George Washington,	Mahanoy City,	Pa.	A. A. Weber.
Smith, Howard Metancthon,	Scranton,	Pa.	W. J. Pechin.
Smith, Frank H.,	Quakertown,	Pa.	S. Penrose, dec'd.
Smythe, Edward Stanhope,	Bryan,	Texas.	Dr. Smythe.
Snyder, Henry Nissley,	Lancaster,	Pa.	C. A. Heinitch.
Snyder, Howard Grant,	Lancaster,	Pa.	B. F. Sholl, M. D.
Sonntag, Maximilian,	Philada.,	Pa.,	W. K. Mattern, M. D.
Southall, Charles Morton,	Clarkson,	Tenn.	Owen Moore.
Spear, Oscar Crow,	Wilmington,	Del.	Dr. J. V. Blackson.
Speer, James Francis,	Shippensburg,	Pa.	Philada. Hospital.
Stengelin, William,	Easton,	Pa.	H. J. Odenwelder.
Stowbridge, George Henry,	Portland,	Oregon.	Plummer & Byerly.
Stone, Mims Baker,	Birmingham,	Ala.	Amzi Godden.
Stouch, Herbert Julius,	York,	Pa.	W. Ranstead Jones.
Stratton, Charles Clark,	Woodstown,	N. J.	Borton & Andrews.
Stunkle, John Louis,	Brownstown,	Ind.	Joseph A. Stillwell.
Supplee, Isaac Morris,	Conshohocken,	Pa.	Dr. Aikens.
Schwarz, Charles Michael,	Hughsville,	Pa.	J. K. Swartz.
Swisher, David F.,	Williamsport,	Pa.	B. A. Hertsch,

<i>Matriculates.</i>	<i>Town.</i>	<i>State.</i>	<i>Preceptor.</i>
Taylor, Thomas Clarkson,	Wilmington,	Del.	P. H. Wood.
Tennant, George Chester,	Vineland,	N. J.	Fred Rapp.
Terry, Ion Ellsworth,	Lancaster,	Pa.	H. C. Archibald, M. D.
Thompson, Herbert Moodie,	Thompsons town,	Pa.	Fred Rapp.
Thornton, Edward Quin,	Greensboro,	Ala.	A. Stollenwerck & Son.
Toland, Arthur D.,	Philada.,	Pa.	H. G. Shinn, Ph. G.
Twitchell, Selden,	Philada.,	Pa.	Special Student.
Tyler, Thomas VanDyke,	Laramie,	Wy. Ty.	H. S. Bartlett.
Uller, Emil Joseph,	Titusville,	Pa.	L. F. Segrest
Van Dyke, William Clinton,	Van Dyke,	Pa.	F. S. Keet.
Wagner, Robert Sidney,	Hazleton,	Pa.	J. A. Jeffries.
Waldenberger, Lewis,	Manayunk,	Pa.	M. A. Hull.
Wallis, Frank James,	Philada.,	Pa.	J. M. Wallis.
Walls, Frank,	Milton,	Del.	A. Nebeker, M. D.
Walton, Lucius L.,	Clinton,	N. J.	Justice L. Hill.
Ward, Percy Hall,	Crisfield,	Md.	C. B. Hunterson.
Warner, Edward Evans,	Philada.,	Pa.	E. B. Warner, M. D.
Wedemeyer, Frederick George,	Hanover, Germany.		E. W. Herrmann.
Weida, Charles Benjamin,	Allentown,	Pa.	C. H. Hæntze.
Weiser, Frank Resler,	Millersburg,	Pa.	J. E. Lehman.
Whittaker, William Hubert,	Dover,	Del.	W. E. Knowles.
White, Robert Walter,	Chambersburg,	Pa.	Charles E. Meyncke.
White, James Wesley,	Point Pleasant,	Pa.	Dr. Benjamin.
Williams, Harry,	Laurel,	Del.	W. J. Hitch.
Williams, William John,	Plymouth,	Pa.	Reese D. Williams.
Williamson, James Strickland,	Harrisburg,	Pa.	Dr. Theodore Jacobs.
Witzell, Joseph Richard,	Tacony, Philada.,	Pa.	Fisher's Pharmacy.
Wolcott, Abraham Lincoln,	Toms River,	N. Y.	Dr. Connel.
Wolf, Fredrick Joseph,	Philada.,	Pa.	R. Shoemaker & Co.
Wolf, Joseph Franklin,	Glassboro,	N. J.	White & Bro.
Woodruff, John Stewart,	Bridgeton,	N. J.	H. F. Seeley.
Woolcock, William,	Mahanoy City,	Pa.	W. D. Reynolds.
Wright, John Armstrong,	Philada.,	Pa.	A. W. Wright & Co.
Yale, Ellsworth William,	Allentown,	Pa.	H. E. Peters.
Yohn, Frank Jerrold,	Pottstown,	Pa.	F. J. Hoskinson.
Young, Charles Cooper,	Beverly,	N. J.	J. E. Himmelwright.
Young, Charles Henry,	Trenton,	N. J.	C. M. Forney.
Zane, James Stewart,	Glassboro,	N. J.	Dr. Souder.

SENIOR CLASS.

<i>Name.</i>	<i>Town.</i>	<i>State.</i>	<i>Preceptor.</i>
Allen, David Roberts,	Paris,	Ky.	C. G. Webs'er.
Anspach, Paul Bucher,	Easton,	Pa.	Weaver & Hohl.
Ashton, Charles Butterworth,	Norristown,	Pa.	Wm. Stahler.
Backenstoe, Harvey Franklin,	Union Deposit,	Pa.	W. Ranstead Jones.
Baer, Jacob Michael,	Hanover,	Pa.	J. T. Shinn. Ph. G.
Balbeirnie, Harold Hubert,	Philada.,	Pa.	Wardle Ellis.
Baldanf, Julius L.,	Henderson,	Ky.	J. A. Flexner
Barnes, Frank Albert,	Philada.,	Pa.	Dr. Jno. Marshall.
Baum, William Louis,	Morris,	Ills.	Dr. C. E. Clacius.
Bear, John H.,	Mt. Joy,	Pa.	E. B. Garrigues & Co.
Beck, Addison Lloyd,	Sharon,	Pa.	
Beckler, Warren B.,		Maine,	A. T. Pollard & Co.
Bender, William Piper, Jr.,	Camden,	N. J.	J. R. Angney, M.D.
Benerman, Alan Herbert,	Philada.,	Pa.	
Benner, Isaac,	Philada.,	Pa.	O. H. Sterner.
Bennum, Charles Henry,	Georgetown,	Del.	Harry Swain.
Bernardy, Emile Seraphin,	Philada.,	Pa.	A. T. Pollard & Co.
Beshore, Ellsworth Smith,	Bethel,	Pa.	J. M. Cunningham.
Bishop, Samuel Walter,	Beverly,	N. J.	H. C. VanMeter.
Black, Charles Edgar,	New Carlisle,	Ohio.	G. B. Evans.
Blomer, Jr., George Davis,	Philada.,	Pa.	G. D. Blomer, M.D.
Bondurant, Chas. Scott,	St. Louis,	Mo.	F. X. Crawley.
Bogart, Charles Mount,	South Amboy,	N. J.	G. W. Jacques.
Bowker, Frank,			H. M. Campbell.
Boyd, Charles Ducharme,	Easton,	Pa.	P. F. Brakely, Ph.G.
Brandt, Irvin Jacob,	Reading,	Pa.	W. J. Shaeffer.
Breneiser, Edgar,	Reading,	Pa.	J. H. Stein.
Brewer, William,	Woodbury,	N. J.	J. W. Merritt, Ph.G.
Brooks, William Dodge,	Memphis,	Tenn.	J. S. Robinson, Ph.G.
Brown, Frederick Kendall,	Seaford,	Del.	A. W. Duval, Ph.G., M.D.
Brownley, Charles Jackson,	Portsmouth,	Va.	Dr. W. O. Higgate.
Bucholz, Wm. MacGilvray,	Sharon,	Pa.	W. Weber.
Burgess, Milton S.,	Cambridge,	Ohio.	C. L. Wall & Co.
Burk, Alfred Gray,	Flemington,	N. J.	E. C. Vogelbach.
Burnett, James Howard,	Hackensack,	N. J.	L. B. Hirst.
Burton, Robert Jump,	Dover,	Del.	T. C. Tomlinson.
Butts, Simon Mark,	Gettysburg,	Ohio.	T. A. Wormley & Son.
Campbell, William Henry,	Philada.,	Pa.	F. Jacoby, Jr.
Carroll, Sherman Lincoln,	Philada.,	Pa.	P. G. A. Weber.
Cassaday, Orlin Ulysses,	Alliance,	Ohio.	A. S. Cassaday.
Cawley, Charles,	Manchester,	Iowa.	E. J. Conger.
Challenger, James Truss,	New Castle,	Del.	E. Challenger.
Christ, Charles Wesley,	Selins Grove,	Pa.	J. E. Lehman.
Clark, Robert, Jr.,	Philada.,	Pa.	B. F. Sholl, M.D.
Cliffe, Albert,	Philada.,	Pa.	T. O. Nock & Co.
Clarkson, P. S.,	Beverly,	N. J.	
Camp, Harry Gearhart,	Mount Joy,	Pa.	J. J. Ottinger.
Cooley, Harry C.,	Carpenterville,	N. J.	
Cotterel, John Wesley,	Harrisburg,	Pa.	D. H. Ross, Ph.G.
Courson, Harry Stockton,	New Berry,	Pa.	W. S. Crawford, Ph. G.
Craine, W. Munroe Clarkson,	Bustleton,	Pa.	H. B. Hooper.
Creighton, Orville Sharp,	Somerton,	Ohio.	B. T. Creighton.
Curriden, George Altick,	Chambersburg,	Pa.	J. C. Altick & Co.
Dana, Jr., Oscar Fingal,	Falmouth,	Maine.	
Davis, John S. V.,	Wilmington,	Del.	H. C. Kemble, M. D.
Dean, Malcolm Graeme,	Newton,	Pa.	I. J. Grahame.
Dehler, Henry Elias,	Cleveland,	Ohio.	O. F. Lohman.

<i>Matriculates.</i>	<i>Town.</i>	<i>State.</i>	<i>Preceptor.</i>
DeReeves, Eugene,	Trinity,	Texas.	M. Campbell, Ph.G.
Donnell, George James,	Clifton Heights,	Pa.	G. R. Vernon, M. D.
Droelle, Frank William,	Detroit,	Mich.	E. S. Power, M.D.
Dunn, Clifford,	Chicago,	Ills.	W. R. Warner & Co.
Durell, Kinsey Embury,	Bustleton,	Pa.	J. W. Kohlerman, Ph.G.
Eagle, Edward Worrell,	New Castle,	Del.	Dr. J. T. N. Blocksom.
Eckels, Howard Samuel,	Mechanicsburg,	Pa.	W. W. Moorhead, Ph.G.M.D
Edenborn, C. Wesley Simons,	Philada.,	Pa.	J. M. Bradford, M. D.
Elden, Wm. McKee,	Bendersville,	Pa.	P. S. Brugh.
Emerson, Henry Everett,	Milford,	Pa.	C. O. Armstrong.
English, Addison Henry,	Freehold,	N. J.	J. E. Keeler.
Ennis, George A.,	Wilmington,	Del.	Kennedy & Lyman.
Evans, Charles Born,	Harrisburg,	Pa.	Jas. A. Meyers.
Falloure, Edwin Reed,	Wheeling,	W. Va.	J. B. Reynold.
Faust, John Kirk,	Reading,	Pa.	J. H. Stein.
Ferguson, James Adams,	Philada.,	Pa.	J. B. Ferguson.
Fetterolf, Daniel Webster,	Ashland,	Pa.	S. A. Marshall.
Finfrock, Ira Elmer,	Mansfield,	Ohio.	M. V. B. Finfrock.
Fisher, Robert Wells,	Seaford,	Del.	Hopper & Forman.
Fletcher, Benjamin Kennard,	Philada.,	Pa.	A. B. Taylor.
Gabell, Pearce Cromwell,	Florence,	N. Y.	Bullock & Crenshaw.
Gallaschick, Paul Herman,	Philada.,	Pa.	H. C. Blair's Sons.
Garman, Jonas Hezekiah,	Lykens,	Pa.	Jonas Garman.
Gearhart, Harry Jacob,	Altoona,	Pa.	B. Carroll Meyer.
Geist, Richard Clement,	Medford,	N. J.	H. P. Thorn.
Georges, A. G.,	Philada.,	Pa.	H. Opperman.
Gingrich, Edward Hartley,	Lebanon,	Pa.	T. H. Potts.
Graf, Albert Fredrick,	Philada.,	Pa.	J. R. Elfreth.
Grayson, John Lincoln,	Shippensburg,	Pa.	L. S. Wolfe.
Grebe, Wm.,	Philada.,	Pa.	William Walter.
Green, Charles Wellington,	Philada.,	Pa.	J. K. Knorr.
Green, Fredrick H.,	Muscataine,	Iowa.	F. Reppert & Co.
Groom, Joseph,	Philada.,	Pa.	Hance Bros. & White.
Gros, Lucian Alfred,	San Francisco.	Cal.	S. S. Bunting.
Guisse, P. Nettleson,	Findlay,	Ohio.	Chas. W. Watson.
Hackett, Henry James,	Philada.,	Pa.	Dr. J. O. Eberhardt.
Hadfield, Edward John,	Dodge City,	Kansas.	Dr. T. C. McCarty.
Haglin, Henry,	Fort Smith,	Ark.	J. M. Sparks & Co.
Haley, John Joseph,	Gloucester City,	N. J.	J. A. Walmsley.
Hamill, John Fredrick,	Norristown,	Pa.	
Hanson, William Henry,	Norri-town,	Pa.	Atwood Yeakle.
Hartzell, Wm. Lincoln,	Philada.,	Pa.	F. G. Howard.
Harrison, Thomas Wesley,	Philada.,	Pa.	W. B. Bicker.
Hassenplug, Wm. Finley,	Williamsburg,	Pa.	Dr. A. W. Taylor.
Hayes, W. N.,	Philada.,	Pa.	J. Frank Hayes.
Heberling, Andrew Jackson,	Danville,	Pa.	
Hellmich, Maximilian,	Philada.,	Pa.	G. H. Ochse.
Hepler, Wm. Louis,	Reading,	Pa.	M. J. Dundor.
Herrmann, Ralph Christian,	Allentown,	Pa.	Augustus Weber.
Hesseke, August Rudolph,	Philada.,	Pa.	J. H. Heintzelman.
Hettinger, Howard Huyett,	Sinking Spring,	Pa.	John B. Raser.
Hibberd, Wesley Jackson,	Bridgeport,	Pa.	Geo. A. McKelway.
High, Edmund Gilbert,	Philada.,	Pa.	Hance Bros. & White.
Hildebrand, John Franklin,	York,	Pa.	F. T. Williams.
Hildreth, Chas. Benj.,	Mansfield,	Ohio.	A. J. White.
Holtzhauser, Ludwig,	Landau,	Germany.	Geo. Bille.
Hooper, Sidney Lee,	Philada.,	Pa.	Bullock & Crenshaw.
Hoover, Henry Taylor,	Philada.,	Pa.	Irving G. Melot.
Horine, Arlington Grove,	Burkettsville,	Md.	W. A. Burns, M.D.

<i>Matriculates.</i>	<i>Town.</i>	<i>State.</i>	<i>Preceptor.</i>
Hørner, Kaspar,	San Antonio,	Texas.	L. Ornynski.
Hostley, Wm. Henry,	Philada.,	Pa.	A. E. Norton.
Howard, Tod,	Findlay,	Ohio.	B. Murray, M.D.
Huber, Joseph Emil,	Peoria,	Ill.	W. N. Benton.
Huntsman, Howard D.,	Richboro,	Pa.	J. V. Antill.
Jacobs, John Penn Jones,	Holidaysburg,	Pa.	E. W. Snyder.
Johnstone, Henry Havelock,	New Castle,	N. B.	E. Lee Street.
Judge, John Aloysius,	Philada.,	Pa.	Bullock & Crenshaw.
Keeler, Chas. Elmer,	Plumsteadville,	Pa.	H. C. Blair's Sons.
Keck, Frank Peter,	Allentown,	Pa.	J. Wyeth & Bro.
Kiefer, John,	Londonville,	Ohio.	D. F. Shnell & Co.
Kelchner, Chas. Franklin,	Bethlehem,	Pa.	C. B. Lowe.
Keller, Chas. Emery,	Plymouth,	Pa.	
Keir, Wm. George,	Philada.,	Pa.	
Klapp, Elmer Augustus,	Lock Haven,	Pa.	
Kooker, Jacob Glaes,	Norristown,	Pa.	Frank. H. Poley.
Krebs, Charles,	Cleveland,	Ohio.	Wm. Krebs.
Krollpfeiffer, Fred. Wm.,	Philada.,	Pa.	C. M. Streeter.
Krull, Lewis Aylesworth,	Harrisburg,	Pa.	H. D. Dietrich.
Kuhn, Gustav Otto, Jr.,	Philada.,	Pa.	Aug. F. Gearhardt.
Lache, Oscar Julius,	Philada.,	Pa.	J. R. Stevenson.
Lackey, Richard Henry,	Philada.,	Pa.	Green & Co.
Latterner, Carl Daniel,	Galesburg,	Ills.	W. T. Baker.
Lantz, John Joseph,	Philada.,	Pa.	W. H. Lantz.
Lehman, Louis John,	Highland,	Ills.	Edwin Knoebel.
Lehr, Joseph Frank,	Lykens,	Pa.	C. D. S. Früh.
Leitch, Chas. Thomas,	Applebachville,	Pa.	C. W. Clymer & Co.
Lenhardt, Oliver Franklin,	Lancaster,	Pa.	A. C. Hubley.
Lippincott, Samuel Wesley,	Burlington,	N. J.	H. B. Weaver.
Leuschner, Paul,	Detroit,	Mich.	Richard Lenschner.
Long, John Nathan Grier,	Honeybrook,	Pa.	J. P. Remington.
Longshore, George Arthur,	Landerville,	Ohio.	C. L. Moore.
Longshore, John Ligget,	Mansfield,	Ohio.	N. Bigelow.
Lord, Miss Anna,	Odessa,	Del.	J. P. Remington.
Loughridge, Samuel Steen,	Philada.,	Pa.	J. M. Higgins.
Ludlam, Wm. Hall,	Brooklyn,	N. Y.	C. H. Gubbins.
Lyons, George,	Philada.,	Pa.	Beates & Miller.
McClanahan, John Thos.,	Galveston,	Texas.	C. E. Watson.
McCoy, Thos. Francis,	Conshohocken,	Pa.	Thos. H. Franklin.
McDavid, Henry,	Hope,	N. J.	R. N. Van Horn.
McKean, Chas. Wm.,	Salineville,	Ohio.	W. W. McGill.
McKee, Alexander,	Philada.,	Pa.	John Wyeth & Bro.
McKee, Joseph,	Bridgeton,	N. J.	H. F. Seeley.
McMechlen, Wm. Benj.,	Wheeling,	W. Va.	W. H. Williams.
McNeil, Robt. Carson,	Philada.,	Pa.	Robt. McNeil, Jr.
Maris, Robt. Wood,	Philada.,	Pa.	S. C. Webster.
Martin, Chas. Henry,	Covington,	Ohio.	C. J. Biddle.
Marquardt, Jesse Claude,	Tiffin,	Ohio.	Z. T. Marquardt.
Mauger, Henry Snider,	Douglassville,	Pa.	H. C. Watt.
May, John Aj.,	Manchester,	Iowa.	C. C. Spannagel.
Mayer, Albert Henry,	Reading,	Pa.	H. H. Kneedler.
Mayo, Caswell Armstrong,	Columbus,	Miss.	J. P. Bolton.
Mell, Samuel Stansberry,	Harrisburg,	Pa.	James T. Shinn.
Mickey, Harry Edgar,	Fo-toria,	Ohio.	Chas. Hays.
Miller, James A.,	Rohrerstown,	Pa.	H. B. Cochran.
Miller, Chas. Joseph,	New York City,	N. Y.	Dr. Chas. Bauer.
Moffett, Thos. James,	Edinboro,	Ind.	L. K. Slifer, M. D.
Moller, John Daniel,	Philada.,	Pa.	Dr. Lamparter.
Moyer, John Oscar,	Auburn,	Pa.	B. T. Coulter, M. D.

<i>Matriculates.</i>	<i>Town.</i>	<i>State.</i>	<i>Preceptor.</i>
Moyer, Wm. Erwin,	Allentown,	Pa.	Sam'l. Gerhart.
Muir, John Ray,	Lock Haven,	Pa.	Wm. A. Rumsey.
Mulford, Harry Kendall,	Bridgeton,	N. J.	L. E. Sayre.
Murray, Wm. Robt.,	Harrisburg,	Pa.	A. W. Nunemacher.
Nardyz, Emma Bour,	Philada.,	Pa.	Susan Hayhurst, M.D.
Neiman, Levi Allen,	York,	Pa.	S. H. Shingle.
Nelson, Wm. Heisley,	Philada.,	Pa.	Smith, Kline & Co.
Neumeister, Otto Chester,	Sheboygan,	Wis.	J. A. Heintzelman.
Nolting, Geo. Wm. Fred,	Seymour,	Ind.	J. H. Andrews.
Ousey, Samuel Byron,	Clifton Heights,	Pa.	Barker, Moore & Mein.
Outhwaite, Chas. Wm.,	Dundas,	Canada.	Wiley & Harris.
Outten, Elmer,	Philada.,	Pa.	S. D. Marshall.
Partee, Wm. Arky,	Nashville,	Tenn.	Demoville & Co.
Painter, Howard Thatcher,	Darby,	Pa.	Harland Cloud.
Patton, John George,	Youngstown,	Ohio.	Dr. M. West.
Pennock, Edw.,	Oxford,	Pa.	Geo. Cook.
Peters, David Augustus,	Harrisburg,	Pa.	J. White Murrow.
Pinchback, Pinckney Napoleon,	New Orleans,	La.	Wiley & Harris.
Platt, Edwin Montague,	Chambersburg,	Pa.	H. C. Blair's Son.
Pleibel, Adolph Wm.,	Philada.,	Pa.	Dr. Fred. Pleibel.
Pollock, Jr., Robt. Blair,	Philada.,	Pa.	J. R. Elfreth.
Porter, Wm. David,	Mahanoy City,	Pa.	C. D. Fröh.
Potts, John Franklin,	Titusville,	Pa.	T. W. Reuting.
Prochaska, Otto,	Cleveland,	Ohio.	C. L. Heckler.
Ranfle, Oscar,	Long Island,	N. Y.	Wm. E. Lee.
Raynor, Howard Lincoln,	Norristown,	Pa.	R. Shoemaker & Co.
Rea, John,	Chester,	Pa.	W. H. Farley.
Read, Clinton Hubert,	Williamstown,	N. J.	Geo. Holland.
Redner, Thaddeus Roland,	Rolandsville,	Pa.	W. C. Ebaugh, M.D.
Reese, Birch Taylor,	Philada.,	Pa.	Wiley & Harris.
Reeve, Walter Sharpless,	Moorestown,	N. J.	
Rehfus, Chas.,	Eaton,	Ohio.	A. P. Blomer.
Rhein, Jno. Henry,	Philada.,	Pa.	H. L. Stiles.
Riedenauf, Fred. Philip,	Philada.,	Pa.	Bullock & Crenshaw.
Reindoller, Chas. Wesley,	Philada.,	Pa.	Chas. G. Frowert.
Ringler, George Parsons,	Bloomsburg,	Pa.	Sam'l. P. Wright.
Ritter, Norman Gruver,	Philada.,	Pa.	Wm. L. Cliffe.
Rixstine, Livingston Everett,	Phoenixville,	Pa.	R. G. Stevenson.
Ross, John Patterson,	Russellville,	Pa.	D. W. Hutchison.
Rottner, Chas. Selner,	Philada.,	Pa.	Pauline Rottner.
Rowe, Wm. Clymer,	Reading,	Pa.	Henry M. Muhlenburg
Ruoff, Wm.,	Philada.,	Pa.	Dan'l. Follmer.
Sample, Nathaniel Welchard,	Philada.,	Pa.	Z. James Belts.
Saurer, Wm. Henry,	Philada.,	Pa.	Chris Petzelt.
Searly, Wm. Notson,	Philada.,	Pa.	Wm. Notson.
Seibert, Edward Grant,	Chambersburg,	Pa.	Clark R. Craig.
Seiffert, Otto,	Davenport,	Iowa.	J. B. Mason.
Seither, Chas. Albert,	Philada.,	Pa.	Bullock & Crenshaw.
Scattergood, Chas. Rinear,	Mt. Holly,	N. J.	Craig Moffett.
Schmidt, Harry Ellsworth,	Philada.,	Pa.	L. C. Funk.
Schofield, Thos. Le Blanc,	Philada.,	Pa.	Hance Bros. & White.
Scott, Wm. James,	Wilkesbarre,	Pa.	Dr. L. W. Hildebrand.
Shaak, Franklin Philip,	Philada.,	Pa.	H. H. Ross, Ph. G.
Shaw, Henry Burfield,	Philada.,	Pa.	W. G. Toplis.
Shoemaker, Ellery Best,	Lock Haven,	Pa.	James G. Wells.
Shrader, Fred Rennard,	Chillicothe,	Ohio.	W. H. Howson.
Simmons, Rob't. Edwin,	Elizabeth City,	N. C.	H. C. Manlove.
Slaughter, John Virgil,	Rio Grande,	N. J.	C. L. Ross.
Smith, Phairis Edwin,	Saegertown,	Pa.	H. Duffield, M. D.

<i>Matriculutes.</i>	<i>Town.</i>	<i>State.</i>	<i>Preceptor.</i>
Smith, Walter Adam,	Philada.,	Pa.	J. H. Bohmer.
Smith, Walter Valentine,	Philada.,	Pa.	V. H. Smith & Co.
Smith, Willard Eugene,	Wilmington,	Del.	Smith Cooper.
Smyser, John Rieman,	York,	Pa.	W. H. Llewellyn.
Snyder, Wm. Lincoln,	Troy,	Ohio.	
Souder, Geo. Reed,	Atlantic City,	N. J.	Souder & Bro.
Steltzer, Nathan Joseph,	Brooklyn,	N. Y.	H. P. John.
Steinmann, Gus.,	Monroe,	Wis.	W. P. Stearns.
Stevenson, John Stuart,	Philada.,	Pa.	Thos. H. Potts.
Stewart, Aaron Walter,	Newtown,	Pa.	Jos. Crawford.
Stewart, Henry Clifton,	Wheeling,	Va.	Henry Mueller.
Strasser, Jr., John Jacob,	Trenton,	N. J.	F. R. Jummel.
Streeper, Frank Park,	Chestnut Hill,	Pa.	T. L. Buckman.
Strunk, Lewis Curtin,	Quakertown,	Pa.	W. M. Brown.
Sutton, Wm. Henry,	Dublin, Ireland.		G. W. Shingle.
Suydam, John Derr,	Philada.,	Pa.	T. E. Conard, M. D.
Tatem, Henry Randolph,	Collingswood,	N. J.	Isaac W. Lutz.
Taylor, Bennett Lewis,	Janesville,	Ohio.	W. H. Graham.
Taylor, Gove Saulsbury,	Smyrna,	Del.	Wm. Spencer & Co.
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Todd, James Charles,	Roxboro,	Pa.	W. C. Todd, M. D.
Trauck, Chas. Cadrick,	Tinicum,	Pa.	Carpenter, Henzey & Co
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Van Scoter, Jay Chester,	Jamestown,	N. Y.	Frank W. Palmeter.
Wagner, Geo. Lewis,	Allentown,	Pa.	D. S. Jones.
Walton, Nathan P.,	Kennet Square,	Pa.	Thos. Hunter, M. D.
Warren, Nathan Chew,	Upland,	Pa.	C. L. La-hell.
Watson, Maurice,	Bristol,	Pa.	Serrill Douglass.
Weber, Wm.,	Philada.,	Pa.	August Weber.
Weckler, Gustavus Adolphus,	Oakland,	Wis.	A. Robbins.
Weidmayer, Fred Franklin,	Leetonia,	Ohio.	J. E. Duff.
Welliver, Robt. Fruit,	Bloomsburg,	Pa.	F. P. Albright.
Wenner, Geo. Victor,	Allentown,	Pa.	N. Ranck.
Werner, Reinhold Chas.,	Milwaukee,	Wis.	H. H. Hackendohl.
Wetteroth, Henry,	Bordentown,	N. J.	B. Hankins.
Weyand, Wm. Jacob,	Philada.,	Pa.	Stansbury & Bibby.
White, Edw. Riall,	Saulsbury,	Md.	Bullock & Crenshaw.
Whitney, Heston,	Glassboro,	N. J.	James G. Wells.
Wilgus, William Alcott,	Philada.,	Pa.	J. F. Wilgus.
Wilkinson, Geo. Henry,	Camden,	N. J.	J. G. Murray.
Winslow, Colburne Thue.,	Benezette,	Pa.	E. W. Sharp.
Wishart, Fred. Gray,	Philada.,	Pa.	F. E. Harrison.
Wissler, Benj. A.,	Millersville,	Pa.	Drs. Keeler & Rauck.
Wolfersberger, Geo. Wash.,	Campbellstown,	Pa.	A. W. Peck.
Wrigley, John Thomas,	Chester,	Pa.	James Spead.
Wyeth, Maxwell,	Philada.,	Pa.	John Wyeth & Bro.
Young, Robt. Taylor,	Philada.,	Pa.	A. B. Wenrich.
Young, Wayland Philips,	Atglen,	Pa.	Dr. O. Higgate.
Zeller, Albert Theodore,	Rochester,	N. Y.	R. Opperman, M. D.

THE AMERICAN JOURNAL OF PHARMACY.

FEBRUARY, 1887.

TEREBENE.

BY H. W. JAYNE, PH. D. and G. H. CHASE.

Read at the Pharmaceutical Meeting, January 18.

Terebene first appeared in chemical literature in 1840, when Soubeiran and Capitaine (*Ann.* 34,311), gave this name to a substance obtained by acting on oil of turpentine with gaseous hydrochloric acid. After removing the solid hydrochloride of turpentine, the liquid portion was distilled over lime. This distillate was their so-called terebene. It was a liquid boiling at 135° C. and differing from the original oil of turpentine by being inactive to polarized light.

Deville, in 1841 (*Ann.* 37,178), described the preparation of this body by the action of concentrated sulphuric acid on oil of turpentine. His terebene was a liquid having a pleasant odor like thyme and the same gravity and boiling point as oil of turpentine.

In 1873, Riban (*Bulletin Soc. Chim.* xx. 100), published the results of an extensive investigation on this subject. According to him the substance obtained by the action of acid on oil of turpentine and heretofore called terebene, was a mixture of true terebene boiling at 155° – 156° C. and cymol 174 – 176° C. He also notes the presence of a camphor among the products of the reaction. This pure terebene had a faint odor and did not solidify at -27° C. When treated with more acid the mixture became hot and a certain amount of terebene was converted into cymol, together with the formation of colophene or diterebene. By continued treatment the terebene was entirely converted into cymol and colophene. This reaction takes place with the evolution of much sulphurous anhydride.

In 1879 an addition to the already copious literature on this subject was made by Armstrong and Tilden (*Berichte* xii, 1752), who thought that terebene was not a chemical compound but a mixture of

several bodies which could be separated by repeated fractional distillation. They found that the greater part distilled between 173° and 180° with, however, a considerable fraction, about 160° . This latter fraction was supposed to be the terebene described by Riban, but instead of remaining liquid at -27° it crystallized in ice, and when carefully fractioned proved to be the inactive solid camphene which small amounts of impurities prevented from crystallizing. The fraction boiling from 170° to 180° was cymol mixed with a hydrocarbon (terpene) boiling at about 178° and having the same composition as the original oil of turpentine. By using dilute sulphuric acid they found the reaction somewhat different, no camphene was formed, the resulting mixture being mostly composed of terpene.

The correctness of these views is doubted by Riban, as Armstrong and Tilden did not follow the method of preparation proposed by him. For, while the latter distilled over his terebene in the presence of sulphuric acid, Armstrong and Tilden carefully avoided high heat and removed all traces of acid before distilling. In considering the above it seems quite possible that Armstrong and Tilden had quite a different material under investigation from that described by Riban. For, as the latter justly remarks, while his terebene was a very mobile liquid, their material was a solid body only liquefied by the presence of some trifling impurities, and thus should, he thinks, present the appearance of a more or less viscous oil.

There are numerous substances that can be substituted for sulphuric acid in this reaction on oil of turpentine, notably among these the fluoride of boron, the former, however, is usually employed.

When this acid is dropped into oil of turpentine the mass becomes heated, and if great care is not taken the turpentine boils with evolution of large quantities of sulphurous anhydride. In extreme cases the reaction becomes so intense that the turpentine bursts in flames. When the reaction is completed the acid is separated from the oil and the latter distilled with live steam. In the distillate an oily layer separates which is collected and rectified. A thick greenish residue is left in the still. This consists principally of colophene. An inactive camphor boiling about 200° C. is also present. This body has been shown to be identical with borneol.

As terebene, scientifically considered, seems to offer such a latitude of opinion it is to be supposed that the commercial article bearing this name would vary very much in its composition. For the

purpose of ascertaining the correctness of this assumption we purchased samples from the leading drug houses of this city. We found it popularly believed that the European articles were the purest to be had. We purchased, among others, a very fine looking English preparation, which is recommended by an authority on throat affections, but as our table shows this was one of the poorest in the market.

The following table was prepared after a careful examination of the material for sale by first-class druggists; great care being exercised in each case to obtain the terebene in its original packages so as to insure its authenticity. The rotation in the following is for 10 cm. of liquid and the mean of six readings. The gravities were taken at 14° C.

No.	Origin.	Rotation.	Gravity	155°	160°	165°	170°.	175°	180°	185°	190°
1	Turpentine.	14° 11'	0.872	3 $\frac{1}{2}$	84 $\frac{1}{2}$	91 $\frac{1}{2}$	96 $\frac{1}{2}$				
2	"	12° 8'	0.882	15	71	86	87	88			
3	"	1° 17'	0.872	0	85	92	96				
4	"	9° 54'	0.872	0	85	92	96				
5	German.	9° 3'	0.910	4	50	64	74	79	82		
6	(?)	8° 13'									
7	English.	7° 58'		0	57	78	86	92	96		
8	American.	1° 44'	0.865	0	10	31	58	76	85	90	92
9	"	1° 26'		6	16	43	70	83	90		
10	German.	0° 58'	0.875	0	59	78	87	92	96		
11	"	0° 26'		0	48	72	82	92			
12	"	6° 18'	0.860	0	0	0	36	74	87	91	95
13	American.	0° 3'	0.860	0	0	0	40	78	91	96	

For convenience of comparison we have added the tests of four commercial turpentines. No. 5 is a terebene, slightly yellow, with smell of turpentine; above 183° this sample decomposed and left a thick resin.

No. 7, a very clear water-white article, smells of turpentine.

No. 13 was prepared by ourselves.

It will be seen by a careful inspection of the above table that the determination of the specific gravity and boiling points are of little value in estimating the purity of terebene. The smell also has no direct bearing on the purity, as the odor of turpentine is masked when mixed with its own weight of terebene. The only reliable determination of purity is the test with the polariscope together with the absence of fractions above 190° C.

If we take the mean rotation of commercial turpentines at 12°, then the samples Nos. 7 and 8 would contain respectively about 75, 65 and 15 per cent. of turpentine oil. No reliance, however, can be

placed on such calculations to determine the *exact* amount of turpentine oil contained in commercial articles, as the rotation of turpentine itself varies so greatly. It should not be supposed from the above that turpentine oil has been added as an adulterant, but merely that it has been insufficiently acted on by the acid. To reduce the rotation to about one degree the reaction may be conducted with comparative ease and large yields; but to remove the last traces great care must be observed, and at the same time the yield is very much reduced. Whether these articles are impure from a lack of knowledge or a desire to obtain larger yields it is difficult to say; yet surely some of the samples purchased by us in the open market are bad beyond reasonable limit.

CHEMICAL NOTES.

ABSTRACTS FROM THESIS.

Bryony root.—Chas. F. Heller, Ph. G., made the following determinations with a specimen of the root containing 7.5 per cent. of moisture. It yielded 5.5 per cent. of ash, consisting of sulphate, chloride and carbonate of potassium, sodium, calcium, magnesium and aluminium. The benzol extract amounted to 0.746 per cent., and consisted of fixed oil, waxy substance and coloring matter. The alcoholic extract weighed 15.494 per cent., and from it the glucoside bryonin was prepared by the process of Walz. The aqueous extraction contained 9.360 per cent. of solid matter, consisting mainly of sugar, gum and albumen. On continued boiling with diluted sulphuric acid starch was the chief principle taken up, the extract weighing 49.024 per cent. Caustic soda now dissolved 6.1 per cent., and the residuary cellulose, after bleaching and drying, weighed 6.506 per cent.

The Ash of Pumpkin Seed, according to John G. Marbourg, Ph. G., amounts to 3.7 per cent. of the air-dry material. Water dissolved from the ash 57.03 per cent., diluted hydrochloric acid 39.59 per cent., and caustic soda 2.03 per cent., leaving 1.35 per cent. of insoluble residue. The ash consisted of carbonate, phosphate and chloride of potassium, sodium, calcium, magnesium and iron, and silica.

The seeds were found to be free from starch and yielded 35 per cent. of a reddish fixed oil extracted by benzol, and 3.05 per cent. of alcoholic extract.

Myrrh.—A sample of myrrh examined by Chas. E. Escott, Ph. G., treated with alcohol, left 56 per cent of insoluble matter. Maceration

with petroleum benzin yielded a pale yellow liquid, which on spontaneous evaporation left 18.75 per cent. of oily residue. Caustic potassa gave with myrrh a solution of a brilliant red color, turning to amber color on dilution. The gum left on treatment with alcohol had a barely perceptible odor of myrrh and a slightly mucilaginous taste, was neutral to test paper, and though of a pale color, gave with water a dark brown solution, the odor changing and becoming stronger, without apparent decomposition. The insoluble portion amounted to 15 per cent., or 8.4 per cent. of the weight of the myrrh. The dilute solution (1:450) acquired a purple color by ferric chloride, changed to reddish yellow by ammonia. Stronger solutions were precipitated by alcohol, not gelatinized by borax, and the precipitate with subacetate of lead was not redissolved. A castor-oil emulsion made with the gum, proved to be not permanent. The gum makes a good mucilage and should be saved for that purpose in making tincture of myrrh.

Damiana.—The leaves of *Turnera aphrodisiaca*, *Ward*, have been examined by F. W. Pantzer, Ph. G. The air-dry leaves lost in a drying chamber 11 per cent. of moisture and volatile oil, yielded 9.68 per cent. of ash. Petroleum benzin extracted 7 per cent. of volatile oil, fat, wax and resinous matter. Alcohol of 80 per cent. yielded 20 per cent. of dark green extract, containing tannin, two tasteless resins and extractive. Water dissolved 16 per cent. of mucilaginous and extractive principles, and by distillation with water $\frac{1}{2}$ per cent. of an amber colored volatile oil was obtained, having a heavy aromatic odor and a warm camphoraceous and bitter taste. Alkaloids and glucosides were not observed.

Phytolacca.—Tannin was found by W. F. Wagner, Ph. G., in the berries, but not in the root. The active constituent was not isolated.

Assay of Cinchona Barks.—Clarence H. McCoy, Ph. G., has determined the amount of total alkaloids and of quinine in three samples of cinchona bark by the process of the U. S. P. Two of the samples were also analyzed by Dr. Squibb's process (*Ephemeris*, I. 105). The results were as follows:

	Total Alkaloids.		Quinine.	
	U. S. P.	Dr. S.	U. S. P.	Dr. S.
Cinch. succirubra,	5.385	5.58	1.265	2.16
Cinch. officinalis (Neilgherry)	9.79	9.82	1.93	2.24
Cinch. Calisaya (quill)	5.275	—	1.35	—

Castile Soap.—Four samples of white Castile soap, examined by H. C. Risher Ph. G., were free from animal fats and salts of metal.

Determinations of moisture and insoluble matters gave the following results :

1. Spanish	11.36 per cent. moisture.	7.73 per cent. insoluble in alcohol.
2. Yanuti	14.94 " "	1.72 " " "
3. Conti	10.99 " "	3.55 " " "
4. Italian	10.66 " "	2.89 " " "

The insoluble matter was almost completely soluble in distilled water.

GLEANINGS FROM FOREIGN JOURNALS.

BY GEO. H. OCHSE, PH.G.

Arsenite of Strychnine is recommended by Roussell as a substitute for arsenical preparations, especially Fowler's solution. Fowler's solution has its disadvantages inasmuch as patients readily become accustomed to it, and when given in large doses it is apt to produce intoxication. When injected subcutaneously it does not possess the above mentioned disadvantages, but has little effect. Arsenite of strychnine injected hypodermically produces excellent results and is not painful. The dose to begin with should be small (0.001 gm). Arsenite of strychnine is a powerful antiseptic. In abdominal typhus it produces excellent results. Combined with salicylate of iron it is given in chronic anæmia, dyspepsia, etc.,—*Rundschau*, Prag, xii, page 855.

Parthenine (see AMER. JOUR. PHAR., 1886, p. 451) has a bitter taste. Given in doses of from 1 to 20 centigrams it aids digestion ; in larger doses it slightly reduces the temperature of the blood, but has no effect on the secretion of urine.—*Ibid.*, xii, page 892.

Galazyme.—Dujardin-Beaumetz gives the following formula : Brewers yeast 4 grams, sugar 10 grams, cows' milk 1 liter. Dissolve the sugar and yeast in a little water, add to milk and keep securely corked in a cool place. The product contains from 1 to 2 per cent. of alcohol.—*Ibid.*, xii, 893.

Eau de Rabel.—Carles states that eau de Rabel has a more agreeable taste, is born better by the stomach and is a better solvent for quinine than dilute sulphuric acid. Eau de Rabel is simply Haller's acid (H_2SO_4 1, Alcohol 3) colored red with red poppy petals.—*Ibid.*, xii, 955.

Cocaine in croup.—Labrie praises cocaine as the best remedy for croup. He applies a brush dipped in a 5 per cent. solution of cocaine to the throat for several seconds, a few drops are allowed to go down

to the larynx. The operation is repeated 2 or 3 times a day and nothing but a little black coffee is administered to the patient.—*Ibid.*, xii, page 955.

Nubian blacking, which is considerably used in England, consists of 32 parts of blacking (made by dissolving 15 parts of aniline blue, and 15 parts of Bismarck brown in 800 parts of alcohol), 126 parts of alcohol, 11 parts camphor, 16 Venice turpentine and 36 parts of shellac.—*Ibid.*, xii, page 817.

Violet-phosphorescent sulphide of calcium.—In commerce there is found a durable violet-phosphorescent sulphide of calcium the preparation of which has been kept secret. According to analysis it consists of 37 per cent. sulphide of calcium, 50 per cent. lime, 7 per cent. sulphate of calcium, 5 per cent. of carbonate of calcium and traces of silicic acid, magnesia, phosphoric acid and alkalies. If prepared oyster shell is heated with sulphur in the same proportions as they exist in the "phosphorus of Canton" a product but slightly phosphorescent is obtained. The following formula is recommended as yielding the best product:—20 grams of lime prepared from the shells of *hypopus vulgaris* are finely powdered and intimately mixed with 6 grams of roll sulphur and 2 grams of starch. About 8 cc. of a solution prepared by mixing 100 cc. absolute alcohol, 0.5 grams subnitrate of bismuth and several drops of hydrochloric acid, are dropped on the mixture and the alcohol having been allowed to evaporate spontaneously, it is then heated in a crucible to bright cherry redness for twenty minutes. The crucible is allowed to cool off, the thin layer of calcium sulphate removed, and the contents of the crucible powdered and again heated for about half an hour. If the heat was not too intense the mass will be granular, breaking readily on slight pressure. When powdered again it loses considerable phosphorescence.—*Chemisch Technische Centr. Anzeiger*, iv, page 845.

Bleaching Liquid.—The addition of a small quantity of glycerin to a bleaching mixture of chlorinated lime and soda makes the fabric whiter, does not affect the fibers, and does not require the use of acid to remove the chlorinated lime.—*Chem. Tech. Centr. Anzeiger*, iv, page 839.

Orcin—a new dermatological remedy—is a white, stable powder having a mild aromatic odor and a sweet, bitter taste, dissolves readily in the ordinary solvents and crystallizes easily from aqueous solutions. Orcin is a dihydroxyltoluol and is closely related to resorcin. It is prepared synthetically by fusing hydroxylate of potassium with chlo-

rocesylsulphonic acid. Like resorcin and ichthyol it is a keratoplastic remedy. In burns it eases pain quicker than resorcin or cocaine, and is worthy of further dermatological experiments.—*Rundschau*, Prag, xii, page 955.

Bark of Pomegranate Root.—By digesting 170 grams of pomegranate root bark with water slightly acidulated with acetic acid at a temperature of 70°C. for 12 hours and repeating the operation twice; then mixing the liquids, precipitating with acetate of lead, removing excess of lead with sulphuretted hydrogen and evaporating the filtrate below 60°C. to syrupy consistence, a liquid free from the astringent and disagreeable taste of the bark is obtained. The quantity mentioned above is for one dose.—*Phar. Zeit. für Russland*, xxv, page 707.

Luminous paper.—The following formula yields a paper which is impervious to water and luminous in the dark. Water 100 parts, paper 40, phosphorescent powder 10, gelatin 1, bichromate of potassium 1 part. The bichromate of potassium makes the paper impervious.—*Phar. Zeit. für Russl.*, xxv, page 712; see also *AMER. JOUR. PHAR.*, 1886, p. 536.

PRACTICAL NOTES FROM VARIOUS SOURCES.

BY THE EDITOR.

Toothache Drops.—A solution is recommended in *L'Union médicale*, composed of camphor, balsam of Peru and alcoholic extract of opium, of each 1 gm., and mastie 2 gm. in chloroform 20 gm. A pellet of cotton moistened with this liquid is introduced into the cavity of the tooth.

Collodion of iodoform has been successfully used for the relief of neuralgia, and is usually prepared by dissolving 1 part of iodoform in 15 parts of collodion. Occasionally 10 per cent., and even 25 per cent. solutions have been employed.—*Nouv. Remèdes*, 1886, p. 525.

An older formula by James directs iodoform 5, balsam of Peru 5, powdered soap 5, and collodion 85 parts.

Preparation of pure Diastase.—C. J. Lintner recommends (*Jour. f. prakt. Chemie*, xxxiv, 378) digesting undried or air-dried malt with alcohol of 20 per cent., and precipitating the decanted solution with absolute alcohol. The pale yellowish floccules are repeatedly treated with absolute alcohol, then with ether, and are afterward dried *in vacuo* over sulphuric acid, when a light, yellowish-white powder

results. This is re-dissolved in water, precipitated by alcohol, macerated in alcohol, washed with ether and dried as before. It still retains about 10 per cent. of ash, mainly calcium phosphate, which, by dialysis, is reduced one-half. Its elementary composition, after deducting the inorganic constituents, was C 46.66, H 7.35, N 10.41, S 1.12. Diastase does not reduce Fehling's solution. Its solution, on being evaporated, acquires a brown color, and, on boiling, separates floccules, which are soluble in caustic soda. With Millon's test liquid it gives the albumin reaction, and with Schönbein's reagent a transient, intensely blue color. This last test is best applied by dissolving a little guaiac resin in absolute alcohol and adding a few drops of commercial solution of hydrogen peroxide, followed by a drop of very dilute solution of diastase.

Bronzing of Metals.—Very handsome colors may be imparted to metals, according to *Metallarbeiter*, by the use of cold solutions of the sulphides of arsenic or antimony. The articles are thoroughly cleaned and dried; a thin layer of a dilute solution of polysulphide of ammonium is applied with a soft brush, allowed to dry, and after brushing off the separated sulphur, a dilute ammoniacal solution of sulphide of arsenic is applied. The color thus produced resembles that of mosaic gold, and becomes deeper and ultimately dark brown by repeating the application of the arsenic solution. A solution of sulphide of antimony produces a rose-colored tint, which may be deepened to dark red.

By polishing, the coating acquires a bright metallic lustre, and by the use of mordants the color is altered. Brass or bronze left for a long time in contact with the mordant becomes superficially greenish-gray, and quite glossy on being polished with cloth; if now treated with the above solutions a dull yellow color is produced.

The bronzing layer may be re-dissolved by ammonia or sulphide of ammonium, and the sulphides of antimony and arsenic may be dissolved in hydrate or sulphide of potassium or sodium.

GLEANINGS IN MATERIA MEDICA.

BY THE EDITOR.

Soluble starch has been observed by Dr. J. Dufour (*Jour. Roy. Micr. Soc.*, Oct. 1886, p. 819) in *Saponaria officinalis*, *Lin.*, in the epidermal cells of the leaves, stem and floral organs, with the exception

of the claws of the petals; and it has been detected also in a number of other plants, both monocotyledons and dicotyledons. It is soluble in water and alcohol, less soluble in absolute alcohol, and with difficulty only in ether, benzol and chloroform. It is rapidly extracted by acids and alkalis, crystallizes in yellowish sphæro-crystals and forms, with water, blue acicular crystals and an amorphous compound. This "soluble starch" is not a tannin as supposed by Kraus, nor an albuminoid as suggested by Nägeli; neither is it a carbohydrate analogous to ordinary starch.

Coniferin.—Hans Molisch (*Ber. D. Botan. Ges.* 1886, p. 301–305) recommends a reagent prepared by diluting a 20 per cent. thymol solution in absolute alcohol with water as long as it remains clear, adding excess of potassium chlorate, and filtering after several hours. On moistening lignified tissue with this liquid and then adding a drop of concentrated hydrochloric acid a blue-green color is produced in a few seconds even in the dark. In this respect it is preferable to Tie-mann and Haarmann's reagent (1874) which succeeds best in direct sunlight, a yellowish-green, blue-green or sky-blue color being produced by phenol and hydrochloric acid.

The reaction is readily obtained with wood-pulp paper, and over one hundred herbaceous and woody plants which were tested, yielded the coloration, which appeared only in the lignified cells, notably in the cell-walls of the wood, then in the pith and bast cells. The coloration is not always alike in intensity which is doubtless due to the variable proportion of coniferin, and it is in some cases masked to a certain degree by the presence of phloroglucin, which with hydrochloric acid, is Wiesner's (1878) test for lignin, a reddish violet color being the result.

Pure coniferin gives only a faint reaction with the reagent. The cause of the intensity of the color in lignified tissue has not been determined. Vanillin always accompanies lignin; but Swedish filtering paper, soaked in a solution of coniferin and after drying, moistened with a solution of gum or of vanillin, yielded with the reagent no color or only a faint one. Tannin, oil of turpentine and fresh vegetable extract did likewise not further the reaction.

A blue color with coniferin, but likewise with vanillin, is also produced by *a* naphthol and hydrochloric acid.

The U. S. P. process for assaying opium has been studied by T. J. Wrampelmeier and G. Meinert, the results being communicated in a

in pure sulphuric acid with a faint reddish color (not colorless), while the colorless solution of pseudomorphine becomes yellowish, then reddish. In the presence of a trace of ferric salt, the solution of morphine is reddish, that of pseudomorphine blue, turning deep violet and finally brown-green.

Mixed with an equal weight of cane sugar, morphine yields with sulphuric acid, either pure or in the presence of iron, a violet-red solution. Under the same condition pseudomorphine gives with pure sulphuric acid a deep green solution becoming brown-green; and in the presence of iron a beautiful blue solution, becoming dark green. On substituting milk-sugar or glucose for the cane-sugar, pseudomorphine gives with pure sulphuric acid a colorless solution turning slowly to greenish and bright blue-green; presence of ferric salt causes the color reactions to be more rapid and intense. These color reactions are characteristic for pseudomorphine.

Wistaria chinensis, Lin. A poisonous glucoside has been isolated from the bark of this ornamental climber by Ottow (*Nieuw Tijdschr.*, 1886, p. 207), and has been named *wistarin*. It is freely soluble in alcoholic liquids, sparingly soluble in ether, chloroform and cold water, is colored violet and green-brown by ferric chloride, and dissolves in alkalis and alkali carbonates with a yellow color, and in sulphuric acid with a yellow color changing to cherry red. *Wistarin* has a bitter and astringent taste, melts at 204° C., is not precipitated by tannin, yields a white precipitate with basic lead acetate and a green one with copper sulphate, and on being boiled with dilute sulphuric acid is decomposed into sugar, a crystalline resin and a volatile oil having the odor of menyanthol; this oil when treated with warm potassa solution is converted into a white compound of a coumarin-like odor.

The bark contains also a resin having apparently toxic properties.

Spiræa Filipendula, Lin., is a perennial herb the tuberous roots of which were formerly used in excessive secretion of mucous glands, and over fifty years ago were recommended in hydrophobia. Recently a Polish physician, Dr. F. I. Jagell, stated that he had successfully used the bark of this plant in the form of infusion, in 88 cases where persons had been bitten by rabid dogs or wolves, 26 of the patients having already exhibited the early symptoms of hydrophobia.

The root has not been fully analyzed, but is known to contain tannin, sugar and starch, and in the fresh state also a volatile oil, which is

probably identical with that of the stem and leaves, this consisting of salicylic aldehyde.

Boldoglucin. Dr. René Juranyille has given in his graduation thesis the experiments and results with this glucoside, the preparation and properties of which were described in the AMER. JOUR. PHAR., 1884, p. 580. On account of its strong odor, boldoglucin cannot readily be given in the form of mixtures; but it was best administered to insane patients enclosed in gelatin capsules or by means of clysters. In doses of 1.5 to 4.0 gm. it produced a decided hypnotic effect, and occasionally cessation of the hallucinations; but these as well as sleeplessness returned on discontinuing the use of the remedy. Though it cannot supplant other reliable hypnotics, it appears to be useful in certain forms of insomnia.

Action of caffeine and theine. Léven in 1868, showed that theine produced convulsions in frogs, while caffeine did not; and that the lethal dose of theine was larger than that of caffeine. This is confirmed by the experiments on frogs, made by Dr. Thos. J. Mays, from which the following conclusions are drawn:

Theine and caffeine agree in the following—

1. They first affect the anterior extremities.
2. They diminish respiration.
3. They produce hyperæsthesia during the latter stage of the poisoning process.

They differ in the following—

1. Theine principally influences sensation, while caffeine does not.
2. Theine produces spontaneous spasms and convulsions, while caffeine does not.
3. Theine impairs the nasal reflex early in the poisoning process, while caffeine does not, if at all, until in the very last stage.
4. The lethal dose of theine is larger than that of caffeine.—

Therap. Gazette, September '86.

China bicolor, *Tecamez bark* or *Pitoya bark* is stated by Vogl (1876) to be very similar in anatomical structure to euprea bark. O. Hesse (Liebig's Annalen, vol. 234 p. 380) finds the bast cells of the former to be in groups of 8 or 10 cells (not arranged in densely packed rows), some of the cells being oval, lignified and with a small cavity, while others are polygonal and almost completely lignified. Its origin is uncertain; Karsten believed it to be derived from a Pinckneya. J. Hodgkin (Yearbook of Pharmacy, 1884 p. 545; see AMER. JOUR.

PHAR., 1884 p. 554), regards the plant to be a *Remijia*, and obtained from the bark 0.75 per cent. of alkaloids of which 0.255 was quinine, 0.06 cinchonine, 0.05 quinidine, the remainder being amorphous.

On analyzing the bark, Pelletier (*Jour. de Phar.*, October, 1825), found no quinine. Peretti (*Gazzetta Eclettica*, 1834-'35) reported the isolation of *pitoyine*, which was tasteless, but after combining with acids very bitter; above 100°C. fusible and partly sublimable in delicate prisms; the sulphate crystallized in white prisms, radiating in fan-like groups; the acetate was uncrystallizable. Hesse (*Annalen*, vol. 166, p. 235) showed that the bark contained no quinine or other alkaloid.

On repeating the examination with larger quantities (60 to 80 gm.) of the bark, Hesse (*Ibid.*, vol. 234), obtained an alkaloid not exceeding 0.1 per cent.; it was absolutely free from cinchona alkaloids, but seems to be related to some of the alkaloids of *Remijia Purdieana* (see AMER. JOUR. PHAR., 1885, p. 199). It is soluble in ether, chloroform, and dilute sulphuric acid with an intense yellow color; the latter solution yields with a little ammonia or potassa a dark yellow precipitate, and dingy yellow precipitates with the chlorides of platinum and of gold, and with strong nitric acid; the solution was completely decolorized and deprived of alkaloid by treatment with a little animal charcoal. Hodgkin's results may probably be accounted for by the admixture of some bark of *Remijia pedunculata*.

Cinchol.—Accompanying kinovin Dr. Giesel observed a crystallizing compound which Liebermann named *oxychinoterpene* (*Berichte D. Chem. Ges.* 1884, p. 871), and which Hesse regarded as identical with his cinchol (see AM. JOUR. PHAR., 1885, p. 457). On re-examining the compound Liebermann (*Berichte*, 1885, p. 1803) found it to agree closely with Hesse's cinchol; but on account of slight differences, and because in some respects it resembles cholesterin, he preferred to name it *cholestol*. O. Hesse (Liebig's *Annalen*, vol. 234, p. 375) has shown that the needle-shaped scales of cinchol prepared from cinchoecerotin, after fusion, will crystallize in broad laminae, and that the compound from both sources may, therefore, be obtained in crystals resembling prisms or scales. The acetyl-cinchol prepared from the two bodies, crystallizes in prisms or after previous fusion, in scales; the melting-point is 124°C.

Lactucerin was prepared by O. Hesse (Liebig's *Annalen*, vol. 234, p. 243) by treating German lactucarium with cold petroleum benzin

decanting and evaporating the clear liquid, heating the residue (lactucerin, resin and caoutchouc) in steam and extracting with boiling alcohol, the mother-liquor of which will finally retain the resin with some lactucerin. The crystals of the latter consist of two esters and yield, with warm, alcoholic potassa, potassium acetate and two alcohols, which after having been washed with water, are separated by boiling with little alcohol.

α lactucerol (formerly called lactucerylalcohol) crystallizes in long, silky needles, is sparingly soluble in cold alcohol, acetone and glacial acetic acid, insoluble in water and alkalies, and freely soluble in chloroform, ether and ligroin, from which solvents it crystallizes anhydrous. It melts at 179°C., may be distilled in a current of carbonic acid gas, and has the composition $C_{18}H_{30}O + H_2O$. Its acetester is produced by continued heating with acetic anhydride, crystallizes in small scales, melts at 210°C., and is freely soluble in chloroform, ether, petroleum benzin, and in boiling alcohol and glacial acetic acid.

β lactucerol remains in the alcoholic mother-liquor of the *α* alcohol, crystallizes with difficulty, and on evaporation is obtained as a gelatinous mass, which on drying forms a white powder; from ether or chloroform it crystallizes readily in long needles of a silvery lustre, and isomeric with the preceding compound.

Lactucerin prepared as stated above, is a mixture of the two esters in varying proportion, and its melting point was found to vary between 182° and 207°C. Since, on heating, acetic acid is given off, it is possible that Lenoir's lactucon obtained in 1846, may mainly consist of lactucerin, which however has not all the properties attributed by Lenoir to his compound.

Lactucon obtained by Franchimont (*Berichte*, 1879, p. 10) from French lactucarium prepared from *Lactuca altissima*, is an indifferent compound, of the formula $C_{14}H_{24}O$, melting at 296°C. and was named *gallacton* by Hesse. A lactucon obtained by Flückiger (*Pharmacographia*, 2d edition, p. 398) had the composition $C_{19}H_{30}O$, and fused at 232°C.

Hesse observes that the lactucerols are isomeric with *sycocerol*, the acetester of which was found by Warren de la Rue and Hugo Müller (*Annalen*, vol. 116, p. 225) in the resin of *Ficus rubiginosa*, and possibly with *hydrocarotin* though he regards the latter as being $C_{20}H_{34}O$ and isomeric with cinchol. *Echicerin* is readily saponified by alcoholic potassa, but the alcohol which crystallizes in needles, differs from

lactucerosol and from sycocerosol. *Euphorbon* has an entirely different behavior, since it is resinified on being heated with alcoholic potassa, or with glacial acetic acid.

Orthosiphon stamineus, *Bentham*, s. *Ocymum grandiflorum*, *Blume*, is indigenous to India, Java and the Nicobar and Philippine Islands. The pale green leaves have purplish petioles and veins, and on both sides of the blade prominent oil glands. Dr. Van Itallie (*Phar. Zeitung*, 1886, p. 376) obtained from the dried leaves a small quantity of volatile oil and of a crystalline glucoside. This *orthosiphonin* has a bitter and afterward sweet taste, is freely soluble in absolute alcohol, less soluble in weak alcohol and in chloroform, almost insoluble in absolute ether, and is precipitated by plumbic subacetate, but not by the acetate or by tannin. It does not contain nitrogen.

THE HISTORY OF CALIFORNIAN BORAX.

BY ARTHUR ROBOTOM.

Sir Edward Bulwer Lytton, in the "Last days of Pompeii," bears testimony to the value set upon borax in the days of the Roman republic. "Borax," says Sir Edward, "was largely used by Nero and his slaves near 2000 years ago, and Pansa deeply regretted that he was not rich enough to buy borax to cover the arena after the death of the combatants at the time of the fight between Lydon and Tetrades." Many a time since my visit to the Californian borax districts has this passage sprung into my mind, and often I have thought what a pity it was that Olanthus, Glaucus, Caligula, and the gladiators did not know of the existence of the great borax lake in Slate Range Mountains, California.

My visit to this lake was one of the most interesting journeys I think I ever made in my life, and the accident of my making this journey arose in the following manner. In the year 1874 I visited the borax deposits in Nevada, and was on my way to San Francisco, when during the journey I was interviewed by a reporter of a *Winne-mucca* newspaper, who, without my knowledge, sent on to San Francisco the following particulars concerning my visit in his paper, and which were duly reproduced before my arrival in the "Californian Alta," of San Francisco:—"Mr. Arthur Robotom, of Birmingham, paid our town a visit a few days ago, on a prospecting tour, to discover if any borate of soda or borate of lime exists in this section.

He was much struck with the number of hot springs that are to be found all through the Humboldt Valley. The borate of soda and borate of lime are known to exist at Hot Spring station on the Central Pacific Railroad, also at Columbus and other parts of this State; and no doubt if the hot springs of Humboldt Valley should prove to give off vapors that produce boracic acid, or that borate of soda is to be found in the alkaline beds which exist all over the district, a new and profitable trade will spring up. The article of borax has been well known all over the civilized world; still but very few people know of its origin. In 1818 Count Lardarel discovered how to prepare boracic acid from the Lagoons of Tuscany, and made a princely fortune by it. This boracic acid was shipped to England and France and converted into refined borax by boiling in large pans, and crystallizing in vats. Tincal was the article used in making borax before boracic acid was discovered. This article is found on the dreary plains of Thibet, in Asia, and sent on sheeps' backs across the Himalaya Mountains to Calcutta, and thence to England. About 20 years ago borate of lime was discovered in Chili, and found its way to England, Mr. Robottom being one of the first to introduce it into that country. Mr. Robottom will also visit the Hot Springs, Wadsworth, Columbus, and San Francisco." The result of this having appeared was that the morning after my arrival in San Francisco my hotel was fairly besieged with persons who were anxious to interview me in my capacity as a borax expert. After many interviews with individuals who professed to hold land said to be rich in borax, I decided to visit and inspect the great Slate Range district, and after making all my arrangements I left San Francisco, proceeding Southwards by steamer down the Pacific coast, and after a pleasant journey arrived at Los Angeles or City of Angels, an old Mexican town. Los Angeles is now, however, peopled principally with Americans, who drive a considerable trade with the teamsters who visit the interior. At this time the Southern Pacific Railway was not made, and this section of the country could be traversed only by the aid of mule teams; the Slate Range lay about 240 miles inland, and the whole country was infested with a band of ruffianly bandits and robbers, composed of the very refuse of society from all parts of California and Nevada. Under these circumstances I soon discovered that my only chance of travelling with any safety was to assume the role of what is known in this part of the world as a "busted" miner,

"busted" being a convertible term for ruined, and derived probably from "bursted," or broken up. I was also informed that on some parts of the journey, hay was worth £50 per ton, and water two shillings per bucket, and that it would be better for me to walk, and much safer. Adapting myself to the circumstances I started in my disguise and travelled with a mule team over a very rough country at the rate of from 12 to 14 miles per day, and arrived at length, without any remarkable adventure, at the shanty kept by Jim Bridger, some 42 miles from the Slate Range, and which is situated on the main road to Cerre Gorda, a wild looking spot, without any other road, the country being covered with the oleaginous plant known as greasewood, and the only animal life being represented by the dismal owl and the deadly rattlesnake! Not a very pleasant prospect, I thought, but I afterwards found when sleeping out in this part of the country that by surrounding myself with the ashes of a greasewood fire or a horsehair rope, that as far as the rattlesnakes were concerned there was no danger, as these reptiles, strangely enough, will never cross the ashes of a greasewood plant, or a rope made of horsehair. While as to the owl his existence was naturally a pure matter of indifference to me, so far as my comfort was concerned.

Rather a curious incident occurred to me while staying at Jim Bridger's: a pioneer and prospector had come from the mountains to get a few supplies from the store, when he saw me sitting on a bench outside, and after a few words had passed, he remarked, "Why you are from the Old Country, and pretty green too! whatever brings you into a country like this? You are no miner! Have you been writing somebody's name on a bit of paper, or done some act as you're afraid of the Sheriff; or are you on the wrong side with the other sex?" My reply was that I was all right on these points, and had come out here prospecting for borax. He at once begged me to have nothing to do with it. He said, "There is plenty of it, but no one knows what it's good for." He had been down to Death Valley, and to the foot of the hills of the Slate Range, through Owen's Valley, and to Mono Lake, and he gave me much information about this "howling wilderness."

After a short stay at Jim Bridger's shanty I again proceeded, steering for the Foot Hills, some 22 miles from the shanty, then onward through a great cañon, or divide, partly covered with salt, on emerging from which I found myself on the border of the most important borax

lake yet discovered in the world. I was met by John and Dennis Searle, two men belonging to the California discovery army that sprang into existence in the year of 1849, and whose members are known by the name of "Forty Niner's." These men, masters of almost every kind of handicraft, had made their way to this great lake with a view of exploration. Consequently, though I can claim to be the first Englishman who visited the borax lake, the honor of discovery does not rest with me. I stayed some time in the hut of these men, and together we examined the ground. I very soon discovered natural borax of the finest quality in a pure state, and though Messrs. John and Dennis Searle had begun prior to my arrival to develop the ground, the first shipment was made by me to England. The borax I found was crystallized borax, in the same form as the regular borax of commerce, and is the only known deposit of natural borax yet discovered in the world. In the centre of the lake is a bed of salt about five miles long; on the outside of this salt is a deposit of carbonate of soda, and some thousands of acres of land covered with crude borax, from three inches to two feet thick. The crude borax is collected and put into cowhide baskets, carried to a large boiling-pan, and boiled for 36 hours; the solution is then run into vats and the crystals form on the sides of the vats. After drying it is put into bags, about 70 lbs. in each bag, and sent to San Francisco, a distance of about 420 miles, and conveyed at that time by mule teams. Before leaving California I arranged to buy 1280 acres of this borax land; I returned to England as quickly as possible, made arrangements to go out again, formed a small company who put up works, and I anticipated making about a million by it, and before long we began to ship large supplies of borax to Liverpool, London, and New York. The price, however, suddenly came down to £26 per ton, the lowest price it had ever been sold for, while the carriage alone from the lake to San Francisco at this time was about £16 per ton of 2000 lbs. This was a paralyzing condition of affairs that quite stunned me. I had made a very large contract for some hundreds of tons to a large firm in England, but before the arrival of the ship with the first parcel the firm failed, and I found myself, to my horror, with some hundreds of tons of borax left on my hands that I could not get rid of, the bankers and financial houses holding the documents all pressing for sales to be made! My golden dream of making a million faded away, and left me meditating the bitter realities

of impending ruin! (I yet anticipated that this property will at some future period be worth £1000 per acre. Experience has proved that the crude borate of soda on the surface of the land reproduces itself every three years.) As soon, however, as I had somewhat recovered from my shock I began to realize that I must do my utmost to find a market for the borax. I was driven to every move that a man could suggest to try and begin to get clear of the stock. I knew that if the public could only be made to understand the true merits of the article, and would begin to try it, all would come right for myself and friends. Consequently I set to work, and began to have the ground borax packed in penny packets. Here again I met with disappointment, for I soon found out that the public are very slow in taking to a new article, and I could not induce the retail shop-keepers to sell it. I offered it to the druggist, they all replied "you want us to sell far too much for a penny, we want eightpence for what you want a penny for; 25 per cent profits won't pay us." I then tried the grocers; they were satisfied with 25 per cent profit, or less, but their reply was characteristically disheartening. "It's all right," they said, "but borax is some kind of medicine, not a grocer's article, we can have nothing to do with it—it's too much trouble to tell the customers its merits." The whole business began to look very dark and gloomy; almost in despair I took a stand at the first dairy show in the Agricultural Hall, and met with marvellous success. I then tried many of the laundries in and about the suburbs of London, and I also tried many of the hospitals and other public places with more or less success.

A lady, universally known from her philanthropy, sent her almoner to see me about it, and a specimen was sent by her desire to one of the first scientists of the day; but the true merits of borax were not then known even to the wisest of the wise. My belief in the borax, however, has never deserted me. I made many experiments and collected much information as to its uses, and the consumption during the last few years has very considerably increased; but this has only occurred since I parted with my interest to the Patent Borax Company of Birmingham, who have naturally been enabled to bring the product more forcibly to the front as one of the most useful and important products yet discovered in the world. I still feel a very keen interest in the future of this product, though I have no pecuniary end to serve in saying so; but the multiplicity of its uses

is truly marvellous, and the following information cannot, in my humble opinion, have too extended a circulation. For the laundry there is a very great deal of labor saved by using borax, as this product "softens" the dirt, and the latter may almost be said to float out of the linen, saving at once the destructive friction, and the time and materials. For the household its uses are legion; beds, &c., washed with a strong solution of borax in the spring, prevents insect life from forming; dusting the floors with dry borax destroys the larvæ of the moth, and keeps the carpets entirely free from insect life. For cleaning marble, plate, jewellery, decanters, plates; for improving the flavor of boiled vegetables, tea, &c., and preserving eggs, fish, butter, and milk, borax, in one or other preparations, is simply invaluable. It is the best tooth-wash known; will clean brushes, sponges, &c., from dirt. Medicinally the value of borax is not as fully known as it should be. I hold letters from eminent medical men who have corresponded with me upon its value, and who esteem it highly. The *Lancet*, of May 20th, 1876, contained a laudatory article on it as a valuable antiseptic "which does not irritate and inflame." I have cured thousands of persons suffering from sore throat, by giving them a small piece of borax to suck (I always carry a bit in my pocket wherever I go); and for dissolving the phlegm and clearing the throats of speakers, my own experience proves to me that it is the only reliable remedy.

Since the first publication of the above, extensive progress has been made in the development of the uses of borax by the general public; and from letters, the thanks and encouragement I am receiving from many friends and strangers satisfy me that I have given information which well repays me for all the trouble, losses, and the inconveniences I have been put to in trying to make this wonderful production better known.

Touching the labor uses of borax, it is mainly used in glazing all descriptions of porcelain, china-ware, pottery, &c. Blacksmiths use it for welding iron and steel. It is used for welding the seams of copper and iron tubes; in the manufacture of hats, jewellery, artificial diamonds, and the plates for affixing artificial teeth. The finest marble cement is made from borax. Farmers, graziers, &c., use it for washing cattle; and provision merchants for arresting or preventing decomposition in their hams, &c. The foregoing will, I trust, awaken people to an interest in this most valuable product of the earth.

Native Borax.—Analysis:—

Sodium baborate—pure.....	99.75
“ chloride—trace only.....	0.25
	<hr/> 100.00

The following are the rates of wages paid for labor in this section :

	£	s.	d.	
Blacksmiths.....	1	0	10	per day.
“ helpers.....	0	12	6	“
Engineers.....	0	16	8	“
Teamsters.....	0	13	6	“
Coopers.....	0	13	6	“
Boilerman.....	0	10	6	“
Watchman.....	0	10	6	“
Laborers, principally Chinamen.....	0	5	3	“

The Southern Pacific Railway Station is only about 72 miles from the lake, where the borax is carried by 20 mule teams, but in about three years or less a railway will run within four miles of this desolate country, when these wonderful natural deposits will be more carefully examined by scientific men.

Before concluding this article, I may here state that the borax lake is not a very enviable place to live in. On my first visit, Jim Bridger's shanty (42 miles from the lake) was the nearest place from which we could obtain our coffee, sugar, or canned fruits, &c., and post our letters. We had no drinkable water within 17 miles. Always a clear blue sky (a little London fog would have been a great treat). Not a tree visible; no vegetable, only the oleaginous greasewood plant. No animal life, no Indians, no clouds, no rain; and last, but not least, a total absence of the fair sex. The freight alone to build our works cost 2½d. per lb. from San Francisco.

107, Dunster House, Mincing Lane, London, E. C.

—*Chemical News*, Nov. 12, 1886, p. 245.

ASH OF CINCHONA BARK.

BY DAVID HOOPER.

Government Quinologist.

I have recently been engaged in examining the inorganic constituents of cinchona bark, and the analysis has been communicated to the Government of Madras for information of the cinchona planters of the Presidency. As the chemistry of this drug will always be of interest to pharmacists, I send some notes relating to the amount of ash and the quality of the ash occurring in barks cultivated in India.

In Flückiger and Hanbury's *Pharmacographia* the following statement is made: "The cinchona barks yield but a scanty percentage of ash, not exceeding 3 per cent., a fact well according with the small amount they contain of oxalate and kinate of calcium."

With regard to the quantity of ash, my experience is that cultivated barks yield over 3 per cent.; the average of three hundred estimations made on samples from this country was calculated at 3.42 per cent. Renewed and old natural barks are the poorer in mineral constituents, but they never fall below 2 per cent. On the other hand, young and branch bark gives as much as 4 per cent., and it is interesting to notice that the leaves afford as much as 5, and sometimes 6 per cent. With regard to the species of cinchona, there is a marked difference in the amount of ash yielded by each, provided that natural bark is operated upon. The crown bark is richer in ash than that of the red, and the red richer than that of the Ledger; and knowing that crown bark grows at an elevation of 7,000 to 8,000 feet, the red at 5,000 to 6,000 feet, and the Ledger at 3,000 to 5,000 feet, the altitude may have something to do with this gradation of ash in the different species.

When gently incinerated at a low red heat cinchona bark should always leave a greyish-white ash. If it is at all reddish, it points to the presence of dust or dirt adhering mechanically to the sample; if weighed, it will be found much in excess of that obtained from clean bark. The two most dirty samples of bark I have met with came from Ceylon, leaving, when burnt, a reddish residue of 18.8 and 19.5 per cent. respectively, but as they were both labelled "dust," neither the vendor would be blamed for the impurity, nor could the purchaser rave on account of its poverty in alkaloids.

A complete analysis was made of the ashes of the two species of cinchona grown on the Nilgiris, the *C. officinalis* growing in the Dodabetta plantation, and the *C. succirubra* from the lower elevation at Naduvatam. Notwithstanding the barks were from different species and localities, the result of the examination shows that there is a great similarity in the composition of the ash.

	<i>C. officinalis.</i>	<i>C. succirubra.</i>
Soluble in water	27.33	24.46
Soluble in acid	66.92	69.94
Residue	5.75	5.60
	<hr/> 100.00	<hr/> 100.00

	<i>C. officinalis.</i>	<i>C. succirubra.</i>
Insoluble silica	5.75	5.60
Soluble silica	1.42	4.40
Alumina	2.70	4.24
Iron Oxide	2.85	3.21
Manganese	trace	—
Lime	32.70	32.80
Magnesia	2.07	2.52
Potash	16.35	12.49
Soda	3.40	2.28
Carbonic acid	27.22	27.77
Sulphuric acid	1.16	1.08
Phosphoric acid	3.93	3.19
Chlorine . . . . .	.45	.42
	<hr/> 100.00	<hr/> 100.00

The chief constituent is the lime which forms nearly one-third of the whole, and exists in the ash in the form of carbonate. The next element of importance is the potash, which amounts to one-sixth and one-eighth of the whole ash respectively.

About fourteen years ago P. Carles wrote a paper on the "Complete Analysis of Cinchona Barks," in the *Répertoire de Pharmacie* (new series), vol. i., p. 60 (which appeared in the *Pharmaceutical Journal*, March 15, 1873), and a complete analysis is given of the ash of Huanuco, calisaya and succirubra barks from South America. His examinations agree on the whole with the above, but he finds traces of copper and appreciable quantities of manganese present. Although there was quartz present in most of my samples, weighed as insoluble silica, yet there was no trace of copper; and the absence of more than traces of manganese is in accordance with the nature of the Nilgiri soils. I am confirming Carles in showing what a small quantity of chlorine is present. As to bark rich in quinine associated with abundance of lime salts, I cannot agree that there is any relation between the alkaloids and the mineral elements. The cinchonas of South America were poorer in quinine than the Indian barks are now, and they yielded about half the amount of ash. On the other hand the Ledger barks, which are richer in quinine than succirubras, always contain less ash, and consequently a less amount of lime. There is not much lime in the Nilgiri soil, yet it seems an essential ingredient in cinchona bark, and is taken up in large quantities, whether the cinchona is grown in India or America.

However different the soils of these two countries may be, a comparison of the analysis of Mr. Carles and myself will show that cinchona bark appropriated to itself a peculiar arrangement of chemical elements. If the arrangement of the inorganic constituents of plants were at all constant it would be a means whereby the chemist could assist the botanist in discriminating between different natural orders, genera, if not species of plants.—*Pharm. Jour. and Trans.*, Jan. 8, 1887.

Ootacamund, India, Dec. 7, 1886.

ACORIN AND ITS DERIVATIVES.

By H. THOMS.

The bitter principle of the rhizome of *Acorus Calamus*, L., was first investigated by Faust (*Arch. Pharm.*, 1867, 132, 214), who obtained a soft resin-like bitter principle of the color of refined honey, to which he gave the name of *acorin*, and concluded from its reactions that it was a nitrogenous glucoside.

Hopff has shown that both vegetable and animal charcoal have the property of extracting the bitter principles from numerous bitter plants. The author employed freshly ignited bone charcoal to extract the principle from the aqueous solution. After two days' digestion of the charcoal, with frequent shaking, the bitterness of the liquid had disappeared. The charcoal was collected on a filter, well washed, dried, extracted with 90 per cent. alcohol, and the filtrate distilled until a turbid aqueous solution remained. The last fraction of ethereal oils can be removed on the water-bath. On treating with ether and evaporating, a honey-yellow balsam is obtained with a faint aromatic odor and a strong, bitter, aromatic taste. The process yielded about 0.18 per cent. of acorin. The product thus obtained was found to be free from nitrogen, the nitrogen in Faust's product being due to the presence of impurity.

Acorin is insoluble in water, dilute acids, and alkalis, easily soluble in absolute alcohol, methyl alcohol, ether, benzene, toluene, chloroform, carbon bisulphide, and acetone. By long heating with dilute acids or alkalis, an odor of ethereal oil becomes clearly perceptible. Fehling's

solution gives a faint sugar reaction. Attempts to obtain acorin in a crystalline form were unsuccessful. Heated to 85° , the color darkens perceptibly. A considerable quantity was heated for several hours at 80° , and with this the subsequent investigation was conducted.

Analysis gave the formula $C_6H_{10}O$. The molecular formula of acorin was deduced from the amount of sugar obtained by the action of dilute acids and alkalis respectively. Discordant results were obtained, owing to the oxidizing effect of the atmosphere, but the results became concordant when the reaction was conducted in hydrogen. The reaction is represented by the equation $6C_6H_{10}O = 3C_{10}H_{16} + C_6H_{12}O_6$; hence the molecular formula of acorin is $C_{36}H_{60}O_6$. Decomposition under the action of emulsin gave concordant results, whilst yeast and saliva failed to cause the formation of sugar, and superheated steam did not complete the decomposition. The ethereal oil formed during the above decomposition was produced in quantity by the action of aqueous soda in a current of hydrogen. After fractionating, the oil boiled at $158-159^{\circ}C$, and had the composition $C_{10}H_{16}$. It has an odor of turpentine, is colorless, soluble in alcohol and ether, and has a sp. gr. of 0.8793 at 0° . A portion boiling at $250-255^{\circ}$ had a bluish color, which disappeared on boiling with metallic sodium, still the hydrocarbon, which now boiled at $255-288^{\circ}$, had the same composition, $C_{10}H_{16}$. It was sparingly soluble in alcohol, readily in ether.

Acoretin, $C_{36}H_{58}O_7$, the resin resulting from the action of dilute acids or alkalis on acorin, is a dark brown, gritty, bitter, viscid body, with a faintly aromatic odor and neutral reaction. It is easily soluble in alcohol, ether, chloroform, and acetone, insoluble in benzene. From its solvents, it separates in an amorphous state on evaporation. An attempt to induce further oxidation by heating with strong hydrochloric acid was unsuccessful. *Acoretin* was not reduced to acorin by the action of zinc and hydrochloric acid, but metallic sodium in the presence of water induced the reduction, as shown by the change in color and odor of calamus. The resin extracted directly from calamus rhizome, when purified, was found to have the same composition as *acoretin*.

The author discovered in the calamus rhizome a crystalline alkaloïd *calamine*, of strongly basic nature; it contains nitrogen.—*Jour. Chem. Soc.* 1886, p. 895. *Arch. Phar.* 1886, 465-481.

THE TESTING OF BALSAMS, RESINS AND GUM RESINS.

Dieterich and, more recently, A. Kremel have attempted to extend the Köttstorfer method of examining fats and oils to the testing of substances included in the groups of balsams, resins and gum resins. The leading idea in Köttstorfer's method, it will be remembered, is that in fats and oils, besides free fat acids, there are present glycerin ethers of fat acids. By titration it is ascertained how much potassium hydrate is required by a unit of the fat or oil to combine with the free acid, and, further, how much is used up in the saponification of the glycerin ether. The former quantity is distinguished as the acid number, the latter as the ether number, and the sum of the two as the saponification number. Quite similar data are yielded by balsams, resins and gum resins, as all these substances contain free acids mixed with varieties of ethers.

The determination of these bodies may, therefore, be carried out in a manner quite analogous to the Köttstorfer method. About one gm. of the substance to be examined is dissolved in alcohol free from acid reaction, some drops of phenolphthalein added and then titrated with half-normal potash solution until there is a permanent red coloration. The quantity of caustic potash used for one gm. of the substance is taken in milligrams, and this is called the acid number. In those substances where ether is present in addition to acid, a definite portion of the liquid is heated with excess of half-normal potash solution, and then titrated back with hydrochloric acid. The quantity of alkali used is calculated to one gm. of the substance, and the number of the milligrams similarly taken as the ether number. The sum of the two gives the saponification number.

In the examination of substances not completely soluble in alcohol they are dissolved with the aid of ether-alcohol or ether-chloroform. Gum resins are first exhausted in a Soxhlet apparatus with alcohol, and the alcoholic extract, after drying and weighing, is estimated; the numbers obtained are not calculated in respect to the whole of the substance originally taken, but only for the quantity of resin soluble in alcohol. In the determination of light-colored substances the use of phenolphthalein presents no difficulty; with dark-colored substances, such as Peru balsam, guaiacum resin, etc., the difficulty is overcome by adding water to the alcoholic solution up to the point of milky turbidity, and then dropping in alternately potash solution,

and, after shaking, phenolphthalein, the end reaction being easily recognized by the formation of a red ring upon the surface of the milky liquid. In some cases (copal and sandarac) there is a formation of precipitate after the addition of potash solution, due to the potassium salts of the particular resin acids being difficultly soluble in alcohol; when this occurs the addition of water will redissolve the precipitate.

The following table, giving the results of the examination of different balsams, shows that a conclusion could be very well drawn from numbers obtained as to the nature of a sample. For instance, an addition of gurjun balsam to copaiba balsam would very considerably lower the acid number of the latter.

Balsams.	1 gm. substance—mg. KOH.		
	Acid No.	Ether No.	Saponif No.
Balsamum Canadense.....	83	—	—
“ “.....	81·3	—	—
“ Copaivæ Maracaibo.....	73-75	—	—
“ “.....	76	—	—
“ Cop. Mar. from <i>Capaifera nitida</i>	78·7	—	—
“ Copaivæ Maturin.....	77·1	—	—
“ “ Para.....	29·6	—	—
“ “ (?).....	78·2	—	—
“ Dipterocarpi (Gurjun Bals.).....	20·0	—	—
“ “ “ “.....	19·3	—	—
“ “ “ “.....	14·2	—	—
“ “ “ “.....	5·8	—	—
“ Mecca.....	45·1	—	—
“ “.....	51·8	—	—
“ Peruvianum.....	40·4	189·8	230·2
“ “.....	40·8	199·2	240·0
“ “.....	49·4	181·1	230·5
“ “ fr. <i>Myroxylon Peruiferum</i>	36·7	104·9	141·6
“ Tolu.....	127·2	26·7	153·9
“ “.....	100·6	58·7	159·3
Terebinthin. comm.....	128·7	—	—
“ “.....	124·4	—	—
“ Venet.....	68·4	—	—
“ “.....	70·3	—	—
“ Chia.....	47·8	—	—
“ “.....	53·4	—	—
Styrax liquid.....	47·6	31·9	79·5
“ Alcohol. depur.....	61·0	76·0	137·0

The important kinds of resins are also distinguishable from one another by considerable differences in the figures, as will be seen from the following table :

Resins.	1 gr. substance=mg. KHO.		
	Acid No.	Ether No.	Saponif No.
Benzoin, Siam.....	141.4	55.4	196.5
“ Penang.....	122.2	57.0	179.2
“ Sumatra.....	96.0	60.9	156.9
Colophonium, light.....	163.2	—	—
“ dark.....	151.1	—	—
“ americ.....	173.0	—	—
“ anglic.....	169.1	—	—
Copal.....	132.0	—	—
“ afric.....	147.3	—	—
“ indic.....	140.2	—	—
“ brasil.....	127.4	—	—
“ fr. Guibourtia copalifera.....	128.9	—	—
“ Zanzibar.....	85.3	—	—
“ “.....	80.0	—	—
Damar.....	31.0	—	—
“.....	34.3	—	—
“ from Damara orient.....	34.2	—	—
“ blanc from Vateria indica.....	15.4	—	—
Elemi, Manilla.....	3.0	24.2	27.2
“.....	17.6	7.8	25.4
Euphorbium.....	13.4	64.6	78.0
Guaiacum.....	23.28	—	—
“.....	44.0	—	—
Jalap in.....	14.7	172.9	187.6
Jalap resin.....	12.9	119.8	132.7
“ “.....	12.1	120.7	132.8
Lacca in granis (alc. depur.).....	—	—	174.8
Shellac, white.....	73.7	102.8	176.5
“ yellow.....	65.5	50.2	115.7
Mastic.....	61.8	—	—
“.....	90.9	—	—
Pix burgund.....	142.2	—	—
Resina Pini.....	77.8	—	—
“ “ (alcoh. dep.).....	102.6	—	—
Sandarac.....	144.2	—	—
Scammonium e radice.....	14.6	171.0	185.6
“ Aleppo.....	8.2	172.0	180.2
Succinum.....	34.4	74.5	108.9
“.....	33.4	91.1	124.5

With gum resins the indications are not so useful :

Gum resins.	Per cent. of resin	gm. resin=mg. KHO.		
		Acid No.	Ether No.	Saponif No.
Ammoniacum, afric.....	77.6	59.0	123.0	182.0
“ persic.....	67.7	112.0	30.6	142.6
“.....	67.1	110.0	50.0	160.0
“ “.....	70.7	100.0	50.6	150.6

Gum resins.	Per cent. of resin	gm. resin=mg. KHO.		
		Acid No.	Ether No.	Saponif No.
Asafoetida.....	72.1	26.8	145.2	172.0
“.....	35.6	54.8	182.1	236.9
Bdellium.....	48.6	26.0	34.7	60.7
Galbanum.....	74.3	28.3	119.3	147.6
“.....	74.2	28.0	132.2	160.2
Gamboge.....	79.6	100.0	56.7	156.7
Myrrha indica.....	30.7	42.1	130.8	172.9
Myrrha.....	39.5	64.0	95.0	159.0
“.....	—	60.2	116.5	176.7
“.....	—	70.3	145.8	216.1
Olibanum.....	—	59.3	6.6	65.9
“.....	72.1	46.8	41.0	87.8
“ indicum.....	67.0	59.3	60.5	110.8

The titration of a gum resin is best effected by mixing one gm. of the substance with some indifferent body (powdered gypsum by preference) and extracting it with 95 per cent. alcohol. The residue from evaporation of the alcoholic extract, which gives the percentage of resin, is then redissolved in 50 cc. of alcohol; half of the solution is used in the acid determination and the remainder in the ether determination, the quantity of potash used being calculated to the gm. of pure resin. The numbers obtained with gum resins were not very concordant, whilst the differences between the different kinds are not so great with the resins. At present, therefore, it seems that titration will only have a limited application to the determination of gum resins. —*Phar. Jour. and Trans.*, Jan. 8. 1887. *Phar. Zeit.*, 1886, p. 477.

THE AMOUNT OF CAFFEINE IN VARIOUS KINDS OF COFFEE.

BY DR. B. H. PAUL AND A. J. COWNLEY.

Having recently had occasion to determine the amount of caffeine in several samples of coffee, for the purpose of comparison, it became necessary in the first place to make some experiments in order to ascertain what method could be relied upon for furnishing uniform and constant results. By extracting the beans with boiling water, completely precipitating the clear liquid with subacetate of lead, then removing any excess of lead from the filtrate and evaporating to a small bulk the caffeine may be obtained in a crystalline condition; but it is

still very impure, and the recrystallization, after pressing between bibulous paper, so readily gives rise to loss that this method cannot be relied upon to give accurate results. It is, moreover, extremely tedious and troublesome. Dr. James Bell¹ recommends as a better method the extraction of coffee beans mixed with magnesia by boiling with strong alcohol, evaporating off the spirit and treating the residue with water to dissolve the caffeine. In this way a considerable portion of the coloring material is separated by the magnesia, and a further quantity is got rid of by evaporating the aqueous solution to dryness with a further quantity of magnesia, and then dissolving the caffeine in hot benzol. We have not, however, found this method to give more satisfactory results than the previous one, and one circumstance that greatly interferes with its application to coffee is the considerable amount of fat present in the bean. After several attempts to modify these methods of treatment for the determination of caffeine in coffee beans we had recourse to the use of lime as a means of separating the tannic acid while dissolving out the caffeine by boiling with alcohol. For this purpose it is advisable to mix the finely powdered coffee with moist lime and then to extract the mixture in a continuous percolator of the kind described by Waitt in this Journal (vol. xiv., p. 376). The alcohol is then evaporated off and the dry residue is mixed with some water and a few drops of dilute sulphuric acid, the addition of which has the effect of separating the fat and clarifying the solution by converting a small quantity of soluble lime salt into calcium sulphate. After filtering the cooled liquid it is quite free from fat, and may then be evaporated to obtain the caffeine in a crystalline state. A better plan, however, is to extract the caffeine from the solution by shaking it with chloroform, in which it is freely enough soluble to be readily taken up, and on evaporating off the chloroform caffeine will be obtained in a condition fit for weighing. The principal points to be observed in carrying out this operation are the acidification of the water solution from the spirit extract and the shaking with chloroform, but with proper care very uniform results can thus be obtained. We have hitherto been in the habit of operating upon 50 grams of coffee beans in each experiment, but after confidence in the method has been obtained and experience in operating, a much smaller quantity might be taken.

On applying this method to the determination of caffeine in various

¹ 'Analysis and Adulteration of Foods.' Part I, p. 16.

samples of coffee we were at first somewhat perplexed by the great discrepancy of the published statements as to the amount of this constituent that is present, as will be seen from the following quotations :

	Caffeine in raw coffee beans per cent.
Robiquet.....	0.32 to 0.64
Liebig.....	0.23 to 0.46
Zenneck.....	0.75
Graham, Campbell and Stenhouse.....	0.88 to 1.00
Dragendorff.....	0.99 to 1.22
Squibb.....	1.00 to 1.03
Bell.....	1.08 to 1.11
Allen.....	0.50 to 2.00

The discrepancy between the data given as applying to roasted coffee is still greater, and in the *Allgemeine Kaffee Zeitung* for 1884 the amount of caffeine in roasted coffee is stated to range from 2.00 to 3.64 per cent.

The first result with which we were struck on carrying out a number of experiments with several different samples of raw coffee beans was the very narrow range within which the amount of caffeine appeared to vary. Instead of being a varying amount, it was more nearly a constant quantity in those kinds of coffee beans we had an opportunity of examining, which were the following :

	Caffeine per cent.
Coorg.....	1.10
Guatemala.....	1.18
Travancore.....	1.16
Liberian.....	1.20
".....	1.28

In making these determinations the raw coffee berries were not dried, but taken just as they came to hand and powdered. A difference in the amount of water might therefore have altered the amount of caffeine in the dry material, but there is not much reason for expecting that the foregoing data would have thus been materially affected. It would be desirable to extend these determinations of caffeine to a number of other samples of coffee from various sources, and it is to a great extent with the hope of obtaining samples for examination that we now make known the results that have been so far arrived at. In a future communication we propose to deal with the determination of some of the other constituents of coffee.

The above determinations were all made with unroasted coffee, and it may be added that in experiments with roasted coffee we found a similar uniformity in the results obtained, so that a determination of the amount of this constituent may probably furnish a means of detecting the adulteration that is now so largely practiced in the sale of ground coffee according to the custom that is general in this country. It has been stated that in the ordinary roasting of coffee the caffeine is to a great extent volatilized and lost. We have strong reason for believing that this statement is entirely incorrect, for in a number of experiments made by roasting coffee beans in which the amount of caffeine had been previously determined in the raw state we ascertained that there was an increase in the amount of caffeine in the roasted coffee and that this increase was uniformly proportionate to the loss of weight experienced by the coffee in roasting. As a general rule the amount of caffeine in pure roasted coffee is about 1.3 per cent. This may be more or less to some slight extent, according as the coffee is slightly or highly roasted, but there did not appear to be any evidence of the volatilization of caffeine during roasting.—*Phar. Jour. & Trans.*, Jan. 15, 1887, p. 565.

NOTES ON THE PHARMACY OF CHIAN TURPENTINE.

BY HENRY CAMPBELL.

Pharmaceutical Chemist.

Attention has again been drawn to this drug by the recent publication of cases of cancer treated with it; and inquiries having been made as to the best mode of dispensing it, I beg to submit a detailed description of the method I have for some years followed (under direction of Professor Clay) in preparing an emulsion of the drug.

It will be remembered that Chian turpentine is an oleo-resin from the trunk of *Pistachia Terebinthus*.

It has no bitter taste whatever, but has a pleasant smell, which is intensified by boiling with sulphuric acid and solution of potassium bichromate, and then somewhat resembles the odor of oil of lemon.

The turpentine is received in two forms; either containing a variable (and sometimes large) quantity of sand, bits of bark, etc., or purified from these by heating with water and straining. When so

purified it has an opaque appearance very different from that described in the text-books; and, in my opinion, is likely to be injured by such treatment.

It has been exhibited in the form of pills and of an emulsion. The finely divided state in which it exists in the emulsion renders it more likely to be absorbed (when swallowed) than if it is given in the pilular form.

The emulsion should contain an invariable proportion of the purified oleo-resin, and must be freed from the ether used in the process.

To do this I prepare an ethereal tincture, ascertain the strength of it, convert it into an emulsion, and expose in an open vessel, with frequent stirring, until all ether has gone off.

To make the ethereal tincture:

Put any convenient quantity of the turpentine into a wide-mouthed bottle, with an equal bulk of ether, cork tightly and shake frequently until all soluble matter has dissolved, set aside until the ethereal liquid has become bright, decant it, and evaporate half a fluidounce in a tarred evaporating dish—at first in a current of air—finally exposing to a very gentle heat for a minute or two (the heat of warm water is sufficient if the dish be rotated).

When the ether has gone off weigh the dish and its contents, deduct the weight of the former and thus ascertain the quantity of pure oleo-resin in each half-ounce of tincture.

The standardized tincture may of course be kept for any length of time, and the emulsion made from it as required.

To prepare the emulsion:

Place in a large mortar 240 grains of pulverized acacia and 50 grains of pulverized tragacanth, add as much ethereal solution as contains 240 grains of the turpentine, mix, and add all at once a fluid-ounce of water, triturate until an emulsion is formed, then dilute gradually to eight fluidounces. Two fluid drachms will contain seven and a half grains of the pure drug, the usual initial dose.

Remove all traces of ether by exposure with frequent stirring in an open vessel, preferably in the cold.

The removal of all ether is important, because the dose of emulsion is gradually increased, and the treatment continued for a considerable time.—*Phar. Journ. and Trans.* Dec. 4, 1886.

Queen's Hospital, Birmingham.

NOTE ON TINCTURE OF STROPHANTHUS.*

BY W. MARTINDALE.

The researches of Drs. Fraser and Ringer on strophanthus, the kombé arrow poison, and the publication by the former of his paper, read at the Cardiff Meeting of the British Medical Association (*Brit. Med. Journ.*, vol. ii., 1885, p. 904), have lately attracted much attention to this drug. Unfortunately a supply of it is difficult to obtain. A paper on the species of strophanthus used in medicine was read at the Evening Meeting here on March 10, 1886, by Mr. Holmes (*Pharm. Journ.*, 1886, p. 778, *AM. JOUR. PHAR.* 1886, 406). Since then a supply of the drug has been received by Messrs. Christy & Co., and a formula for the tincture has been published by Messrs. Burroughs, Wellcome & Co. (*Pharm. Journ.*, 1886, p. 304, *A. J. P.* 1886, 405), on the authority of Dr. Fraser. It directs that 1 ounce of the seeds, first deprived of their oil or fat by means of ether, is to be percolated with rectified spirit to produce 8 fluidounces of tincture. As pharmacists have looked with some suspicion on the employment of ether for the extraction of the fixed oils from such drugs before making pharmaceutical preparations of them, for example in the present process for making extract of stramonium and in the now discarded process for making liquid extract of ergot, I therefore wrote to Dr. Fraser pointing this out, stating my fear that some of the activity of the strophanthus seeds might be removed by the ether, and mentioning also that as there was a tendency to decimal proportions for these preparations, I thought that a 1 in 10 tincture would be preferable. I concluded by saying that I should be glad to have a reply from him in corroboration or otherwise of the formula published by the above-mentioned firm. He replies:—

“The active principle of strophanthus is practically insoluble in ether, and therefore it is quite a suitable solvent for the oil whose presence is objectionable in the tincture.

“I have used a tincture of various strengths. Seeds alone without hairs 1 in 8 of rectified spirit was adopted because of its being the strength of tinct. of digitalis, and the dose of such a tincture is 2 to 4 minims.

“As this dose is inconveniently small, especially for children, I now generally use a tincture of half the strength, 1 in 16.

*Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, Wednesday, November 17.

"One in 10 would not get over this difficulty. The dose of the tincture of 1 in 16 would, of course, be 4 to 8 minims.

"I have not seen the letter of Burroughs & Wellcome to which you refer."

He further writes:—

"Although the pods contain active principle, the relation of a tincture obtained from them to a tincture from the seeds has not been determined. The two should not therefore be used together. The preparation I have used in therapeutic work has always been the tincture from the seeds. I do not know what the dose would be of a tincture from the combined pods and seeds. I think also the seeds freed from their comose appendices should alone be used. In reference to the preliminary extraction with the ether, it is obvious the ether should be washed to remove spirit."

This is so far conclusive, and as the results of other therapeutic observers will have to be compared with Dr. Fraser's, when tincture of strophanthus is ordered pharmacists must supply the tincture of the seeds only, deprived of oil. Still, as the drug is scarce and costly it is well that we should examine it and try to utilize all the parts of it that possess activity. While awaiting Dr. Fraser's reply I prepared a little tincture of the bruised natural seeds by percolating one part with rectified spirit *q. s.* to produce 8 fluid parts. It is labelled *a*, is of a yellowish-green color and has a characteristic bitter taste. I did not examine the marc of this to notice if it was exhausted.

Nearly one-half the weight of the pods now offered for sale consists of the linings of the pericarps, one-third (nearly) is seeds, and about one-fifth is hairs.

In preparing Dr. Fraser's tincture, the seeds in coarse powder were percolated with about five times their weight of ether, specific gravity 0.720 (the rectified washed methylated). A deep emerald-green liquid having a claret-colored fluorescence was obtained. It has deposited a small quantity of crystalline sediment. Evaporation of a part of it shows that the seeds yield 27 per cent. of dark green ethereal oil or oily extract, which is very bitter in taste, and only slightly soluble in rectified spirit. After the ether was evaporated from the marc this was again slowly percolated with rectified spirit, 1 to produce 8 parts of yellowish-green colored tincture marked *b* 1, but this is much paler than tincture *a*. Percolation was continued fraction-

ally to produce a second 1 in 8 percolate, marked *b* 2, and a third, 1 in 4, marked *b* 3; the last two percolates are practically colorless, but bitter, and although their specific gravity is the same as the spirit used in making them, yet the marc is still bitter. The specific gravity of the first percolate is nine points higher. Mixed, these three percolates would produce a 1 in 20 tincture.

The depurated tincture *b* 1, on addition to water, of course forms a clear mixture; but tincture *a* only causes a slight opacity when it is mixed with water—very little more than the same quantity of tincture of orange peel would cause.

I also percolated a separate tincture of the powdered pericarp lining, 1 in 8 with rectified spirit, marked *d*. It is pale greenish-yellow in color, has the same but less bitter taste than the tincture *b* 1, and is five points lower in specific gravity. The marc left was still bitter. I likewise prepared a tincture of the hairs 1 in 8, with rectified spirit, marked *c*. It has the yellowish-green color of tincture *a*, and has a similar bitter taste, although according to Messrs. Hardy & Gallois (*Pharm. Jour.*, 1877, p. 756; *Am. Jour. Ph.*, 1877, p. 402) the hairs only contain ineine, a crystalline principle which has not the same physiological action as strophanthin contained in the seeds; this stops the heart's action when its solution is injected into a frog, which ineine does not.

I give these results of my experiments, expecting to elicit expression of opinion as to what formula might eventually be adopted. The present one, Dr. Fraser himself acknowledges, produces a preparation too concentrated for practical use. As the drug arrives with a variable amount of the pericarp adhering, and this generally in bad condition, and as the hairs are said to possess different properties to the seeds, I think the seeds alone should still be used, as they only can be relied upon to produce an uniform tincture. The other portions possessing activity might be economized for preparing the active principle. Care must be taken in handling the drug and its preparations, as they act as topical irritants, to the mucous membrane particularly.

Since writing the above Dr. Ringer has kindly tried the ethereal oil on frogs for me and finds that although not inert it does not possess much activity, not nearly so much as a 1 per cent. solution of the arrow poison.

Mr. T. R. Bradford, of University College, to whom I gave samples, also writes:—

"I have performed some experiments with the tinctures of the seeds, pods, and hairs, and I find them all active; but that obtained from the hairs is the weakest, and that from the seeds is the strongest in arresting the movements of the frog heart. They are also all of them powerful muscle poisons, particularly the pod tincture, but of course to decide this more experiments would be necessary."—*Phar. Jour. and Trans.*, Nov. 20, 1886, p. 411.

VARIETIES.

AGARICUS ALBUS has been successfully used by Dr. A. Peter (*Med. News*) for relieving the sweating of consumptives. Ten grains given at bed time had a cathartic effect; but given in five grain doses no such effect was observed, and in about a week all sweating ceased. When a return of the night sweats is threatened relief is again afforded by the remedy, which has no effect upon the cough.

AGARIC ACID in doses of $\frac{1}{12}$ to $\frac{1}{8}$ grain has been similarly employed.

QUININE RASH.—Dr. M. A. Veeder, of Lyons, N. Y., observed a case of quinine rash in which the condition of the skin closely resembled that existing in scarlatina. The patient had been taking quinine in small doses for some slight disorder, supposed to be malarial; but, becoming alarmed, medical advice was sought, and the taking of quinine was forbidden. The rash disappeared promptly, but returned again when, as an experiment, quinine was administered in small doses.—*N. Y. Med. Record*.

HYDROGEN DIOXIDE IN CATARRHAL AFFECTIONS.—Dr. John N. Mackenzie directs attention to the use of hydrogen dioxide in four-per-cent. solution for catarrhal affections attended by profuse muco-purulent discharge, used in doses of a fourth to half an ounce three, four, or even six times a day; for topical use he prefers a six-per-cent. solution. By some persons even weaker solutions cannot be used, on account of their irritating effect upon the air-passages. A marked improvement in the gastric functions was incidentally observed during its administration. Indeed, so striking has been its effects in this regard that it is worthy of more extended trial in obstinate stomachic derangement.—*Phil. Med. Times*, Jan. 8, 1887, p. 268.

CHARCOAL AND CAMPHOR.—A mixture of equal parts of camphor and animal charcoal is recommended by Barbocci for preventing the offensive odor and removing the pain of old excavated ulcers. The camphor is stated, to act as a disinfectant, and the charcoal absorbs the offensive odors.—*British Med. Jour.*

SOLANINE.—Dr. Geneuil (*Bull. gén. Ther.*) has given the hydrochlorate in doses of one half a grain, repeated three or four times a day, in cases of neuralgia, rheumatism, obstinate vomiting, spasmodic nervous affections, asthma, and bronchitis, and believes that the remedy will prove to be of great value in the treatment of these and similar affections. The following are his conclusions: (1) Solanine is a poison to the terminal motor plates. It narcotizes the medulla and spinal cord, causing a paralysis of the terminal, sensory, and motor

nerves. By reason of this action solanine is to be classed among the best of the analgesics. (2) The drug may be prescribed in large doses without danger, and presents none of the inconveniences of morphine or atropine. There is no danger of a cumulative action. (3) Solanine does not cause congestion of the brain, even in the aged, and, probably, a like freedom from this danger exists in the case of children. (4) In all cases where it is necessary to calm excitement, relieve pain, or overcome spasm, solanine promises excellent results. It may be given with advantage in the place of morphine for the relief of any of these conditions.—*Med. Record.*

PHARMACY IN INDIA.

Read before the Alumni Association of the Philadelphia College of Pharmacy, January 18st.

LAHORE, INDIA, November 27, 1886.

The subject "Pharmacy in India" is probably one which has not been brought before you, and for this reason I am induced to address you, trusting the characteristics of Indian pharmacy will make up any lack of composition by the writer. In the first place there is no pharmacy law in the country, and any one can engage in the drug business regardless of his knowledge of chemistry. Hence, there are all sorts and conditions of chemist shops from the strictly legitimate shops of Calcutta and Bombay to the native medical halls in the bazaars, where poisons of all sorts are as freely sold as Epsom salts. In Calcutta and Bombay the drug stores are on a line with the pavement as at home, but in other cities and stations of India they, as well as all stores, are built in the centre of yards, or, as called here, compounds to which there is an entrance and exit gate. The buildings are all one story with very high ceilings, large airy rooms, the store portion to the front and residence part in the rear. Over the entrance to the store a portico is built on account of the great heat of the sun, which would be felt severely by some persons even in the short space of time occupied by leaving the carriage and entering the store. Around the portico are potted plants, rose bushes, etc., and the entrance is, as a rule, bordered with potted plants. Hence, we have no window display, and the part of an apprentice's life, the flies in the window, is unknown here. Outside of Calcutta and Bombay, there are no strictly chemist businesses; but this is an adjunct to a general store, and as a rule is the best paying branch of the business. The chemistry part of the business takes the lead in the firm's advertisements, as Root & Co., chemists and general merchants, and this is carried out by merchants whose stock in trade consists of a few auction patent medicines.

The British Pharmacopœia is the standard, but many Indian medicines are prescribed, and there is an Indian Pharmacopœia which is unofficial. Many American preparations are used and the United States Pharmacopœia is to be found in every drug store. American patent medicines have a very large sale, and among the non-secret preparations Parke, Davis & Co.'s Fluid Extracts and McKesson & Robbins' Capsuled Pills have become best known. The quantity of McKesson & Robbins' Quinine Capsules that are sold is marvellous. Of course this is a country of fevers and malaria, and the perfection

which these capsules have reached have impressed themselves on the medical men, and the natives are among the most frequent buyers. To sell them in bottles of one hundred is of very frequent occurrence. The patent medicine trade is large, but it is much hampered by the natives who sell at prices that Europeans cannot touch. Most of the goods of the former are auction goods, such as have been on the shelf until the wrappers become unsightly and are then handed over to the auctioneer. Then the native bears the same relation to the European as the Chinaman to the American; he can live on such a small amount that the profit on one bottle of medicine would keep him in food several days.

Connected with all chemist shops (the term for drug stores) is a manufactory for aerated waters, the sale of which is enormous. Aerated water (carbonic acid water), soda water (with a tinge of bicarbonate of soda), lemonade, gingerade, tonic water (with a trace of quinine), and potash water are those principally bottled. Soda water is kept in bottles of 14 ounces capacity, and the sweetened waters in 12 ounce bottles. The water in India is very bad and many persons never drink anything but aerated waters; but what causes the greatest consumption of soda water in India is the "Peg." This is a drink of whisky or brandy mixed with a bottle of soda water, and ninety-nine one hundredths of the liquor is drank in this way. Whisky is never drank "neat;" but although it is well watered, I doubt if there is a place in the world where the consumption of liquors will average that drank by the European population in India.

The term European applies to all foreigners in India who are of white skin. The aerated water trade is being much cut into by the regimental messes who are large consumers. They buy a machine, manufacture their own waters and sell them to customers at greatly reduced prices. A petition has gone up to the Viceroy from the tradespeople, protesting against the soldiers competing with them in this way. Natives do all the work, prepare the syrup, and bottle the waters.

A feature of the drug business is that no small quantities are sold as a general rule. Most things are put up in bottles and the customer must take a bottle or none. If he asks for an ounce of chlorate of potash lozenges, he is told they are only kept in bottles, one rupee each, a four ounce bottle containing about three ounces of lozenges for forty cents. Vaseline, lime water, ipecac wine, spirit of nitre, etc., are all kept in bottles, and it is very seldom any one inquires for half an ounce or one ounce, and sends a bottle for it. Many things that are sold several times daily in all shops at home, rarely find a sale here. Senna, salt, magnesia and paregoric are sold once a week probably.

The prescription trade is large and profitable, there being a fixed price which is adhered to by most Europeans. There are many native chemist shops which advertise the compounding of prescriptions, but many who deal exclusively with them for other things, send their prescriptions to European chemists.

There are a great many native doctors who have a diploma from some Indian native university, who can speak and write English, and have considerable practice. Then there are the apothecaries, who are employed by the government in every station to take charge of the station dispensary and practice

among the government clerks, such service being given to them free, while the apothecary draws an income also from the tradespeople, many of whom employ him. The European doctors are all army surgeons who are appointed civil surgeons in the different European stations. Besides drawing his army pay he enjoys a large income from his practice. A civil surgeon serves three years in one station and is then transferred to another. From these different practitioners there comes a large prescription business and sale of surgical appliances, etc.

Few customers appear at the store and then only when it is necessary to select, or when buying fancy goods, etc. A greater part of the trade is done by chits (notes sent by servants), and nine-tenths of the business is credit. Such a country for credit does not exist in another place and there is not a firm that does not carry a large amount of bad debts on its books. People seldom carry money with them and credit is refused only to those who are known as "bad hats."

Now, as to the preparation of prescriptions. In Bengal and the Punjab the eastern and northern portion of India, the European assistant copies the prescription in the book, and at the same time calls out the ingredients to a native, who is called a compounder. He has served a sort of an apprenticeship in some dispensary, then has some experience in a drug store and there develops into a compounder. He seldom speaks English, but, as a rule, can make out the names of the ingredients and quantities, but can seldom read directions. He places all his bottles on the counter and then prepares the prescription while the European gives him the quantities. Unless the prescription requires some special manipulation, he manages to compound it all right; but otherwise it is necessary to stand by him and tell him what to do. They do everything, prepare plasters, suppositories, etc., make all the preparations for the shelves, but everything must be checked. After the prescription is compounded, he calls out the quantities and has his bottles in order as they appear in the prescription. Often he has gotten hold of the wrong bottle and the preparation is useless, and all it concerns is an ejaculation and it passes out of his mind the next minute. It would be impossible for Europeans to do the work, the heat is so great and working away at a batch of pills would cause a profuse perspiration in two minutes. There is a native for everything and on account of the caste institution of India one man will not do the work of another. There is one man whose special duty is washing bottles, etc., another acts as an apprentice to the compounder who shoves the hard work on him, such as working pill masses, pounding roots, etc., and so firm set are they in their feeling of respect for those above them they dare not rebel.

Bills are all collected by natives called chupprassees, and are sent out at the beginning of each month. There is a system of checking by which the bills can be traced daily to each chupprasee; and should any money be missing or not be turned in, and some customer declared he paid, the chupprasee to whom the bill was delivered on the day of payment can be traced at once. But there is little stealing this way and natives are trusted with large amounts in their possession.

But nine-tenths of them steal, though in small amounts, and while your man would not steal a hundred dollars from you he would not scruple to steal a two cent piece. It is necessary to keep all the show cases locked day and

night, and when serving a customer, you are compelled to unlock a case before you can get at the goods. Quinine and expensive chemicals are also under lock and key. The natives in the government dispensaries stole so much quinine that, to protect itself, the government have all their quinine colored pink, which effectually prevents any one from disposing of it. As for lying, they are professionals, from the compounder to the lowest menial, and they can hatch up a lie in a twinkling. There is a man (Chowkedar), who sleeps on the verandah at night to receive any chits that may come and also to guard the place.

In the Bombay Presidency the European clerk has a still better time of it as Portugese compounders are mostly employed, and they write their own labels, copy the prescriptions and do not require checking. But what is most to be commended in the business in India are the hours. Here in Lahore we open at eight o'clock and close at six. One hour is allowed for breakfast, one for dinner or lunch, and a cup of tea is brought into the shop about four o'clock; close on Saturday afternoon at two, and never open at night or on Sunday. In Simla, in the Himalayas, where I served two years, in winter we opened at nine and closed at five in the afternoon.

It is a poor place to apprentice a white boy. From his earliest days all his work is done by natives, and when he comes into a shop he thinks he is being made a menial if called upon to do anything servants could do. So he gets no practical experience in the rudiments, learns the business in a superficial way and would not be fit, when three years in the business, to take the place of a six months' apprentice at home. But don't let any one who hears these lines come to India on a speculation. In the first place the climate is against you. Should you be on a Plains' station during the summer you must be under a Punkha—a large fan, which swings backward and forward above your head, creating a breeze—all day and all night. One is over your head in the dispensary, another in the shop proper, one over your dining table, and one over your bed, and this last is the one which causes one to forget the commandments if anything in the world does. You go to sleep with the punkha coolie giving you a fine breeze. After an hour he falls asleep and you awake in a profuse perspiration and with a muttered ejaculation shy a boot at his head, which effectually wakens him for another hour. And thus goes on the night and the poor punkha coolie in the morning is only too glad to get away and soothe his bruises.

It is difficult to get a situation. I came to India knowing nothing whatever of the country nor anybody in it. I found but three chemist shops in Calcutta employing Europeans, and this is the largest city in India. Then I received the awful information that every chemist brought his assistant (drug clerk) out from England on an agreement, passage paid out and back, and the clerk to stop with his employer three, four or five years as the case may be. In three weeks I was fortunate enough to secure a vacancy, but I might have been six months without even hearing of one. For a clerk to leave at the end of his agreement long notice must be given, allowing his employer ample time to bring out another man from England. Lastly your salary varies, a very distressing fact. The rupee, the coin used in India—silver—fluctuates. When I came to India it was worth one shilling and eight pence—40 cents; then it went down to 1.6, then to less than 1.4 (32 cents), and now it is at one and six

pence; it should be two shillings (50 cents) when at par, and I trust that when I leave the country it may be at a favorable rate of exchange to somewhat compensate me for the heat and fevers that I have endured since entering the country.

I trust these lines may have proved of interest to you, and that it may not be many days before I can be present at one of your social gatherings.

JOHN A. FALCK.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, January 18th, 1887.

The fourth of the present series of pharmaceutical meetings was held this day, Mr. Wm. B. Webb being called to preside. The minutes of the last meeting were read, and there being no corrections required, they were approved.

Donations to the library and cabinet being in order, the actuary presented the fourth edition of the National Dispensatory from Prof. Maisch; Buffon's work on oviparous quadrupeds and serpents, in four volumes; and from Dr. Andrews, through Dr. A. W. Miller, a copy of "House-plants as Sanitary Agents." On motion, a vote of thanks was directed to be returned to the donors by the actuary.

Professor Trimble presented to the cabinet a remarkably fine specimen of *Thymol*, which Mr. Jenks had given him for that purpose. It had deposited from a five-pint bottle of oil of horsemint that had been standing for a long time undisturbed.

Mr. Webb, who was absent from the last meeting, remarked that he observed upon the reading of the minutes that *oil of camphor* is largely imported, but a use for it was not stated. This oil is largely used as a rubefacient in veterinary practice, one dealer who supplied some large stables with it buying it in quantities of 500 pounds at a time.

Professor Trimble read a paper on *Terebene*, by Dr. H. W. Jayne and Mr. G. H. Chase, which was listened to with a great deal of interest. There has been considerable interest manifested in terebene as a remedy in pulmonary affections, and it has been used considerably by several physicians who make throat and lung diseases their specialty. The paper was illustrated by a table, to which Professor Trimble called attention, showing that the variations in specific gravity did not indicate in any wise the purity of the preparation; this is indicated only by its being devoid of any rotary power in the polariscope. On motion, a vote of thanks was ordered to be returned to Dr. Jayne and Mr. Chase for their interesting and valuable paper. The paper was referred to the publishing committee.

Dr. Miller exhibited a specimen of a bark which Dr. McCollin, Demonstrator of Pharmacy in the Jefferson Medical College, received from a student of that College, a Chinaman. The peculiarity is that the bark when broken transversely shows a layer of silky fibers which still hold the two pieces together. Another specimen exhibited was the fruit of a plant said to furnish a variety of tapioca.

Professor Remington exhibited two balances of the variety known as *torsion balances*. They depend upon the tension of a wire which has been strained

with some sixteen pounds of weight; by recent improvements steel wire has been substituted for a gold one. This, and shortening the bridges, give a steadiness which former ones were very deficient in. In answer to an inquiry, Prof. Remington stated that the balances, when loaded with an ounce in each pan, were sensitive to a milligramme. There being no further business, on motion adjourned.

T. S. WIEGAND.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

The National Dispensatory, containing the natural history, chemistry, pharmacy, actions and use of medicines; including those recognized in the Pharmacopœias of the United States, Great Britain and Germany, with numerous references to the French Codex. By Alfred Stillé, M. D., LL. D., etc., and John M. Maisch, Phar. D., etc. Fourth edition. Philadelphia: Henry C. Lea's Son & Co., 1886. Large 8vo, pp. 1781. Price, cloth, \$7.25; leather, \$8; half Russia, \$9.

The previous editions of the above work have been fully commented upon in this Journal for the years 1879 and 1884. Near the close of 1885 the new British Pharmacopœia made its appearance, which differs in many important and numerous minor points from the previous edition of that Pharmacopœia in 1867. These differences may be briefly summarized as follows: The pharmacopœial names of about two hundred drugs and preparations have been changed; twenty-two drugs and preparations have been dropped; about one hundred and sixteen new ones have been added, and the composition of a large number of preparations has been more or less altered. All the references throughout the Dispensatory, bearing upon the British Pharmacopœia have been carefully revised so as to correspond with the present requirements of that authority.

A large number of remedial agents have attracted more or less attention during the past two or three years. Some of these promise to be of permanent value. Of the more important new remedies, which were not, or but briefly mentioned in the third edition, the following are now more fully noticed: antipyrina, cocaine hydrochloras, fabiana, franciscea, gymnocladus, hydroquinonum, hyponum, iodolum, jacaranda, lanolinum, menthol, phormium, sulphophenolum, thalline sulphas and urethanum. Iodol (page 1660), is not an addition product, but a substitution compound of pyrrol, having the formula C_4HNI_4 .

It will be seen from the foregoing that the present edition of the work before us includes besides the unofficial articles, and those of the United States Pharmacopœia, likewise those of the latest issues of the three principal pharmacopœias of Europe, namely Great Britain, France and Germany.

—1.

The Pharmaceutical Era, a monthly exponent of pharmacology in all its departments, including Chemistry, Microscopy, Botany and the art of Pharmacy. A. B. Lyons, M. D., editor. Published by D. O. Haynes & Co., Detroit, Mich. Price, \$1.50.

With the beginning of 1887 the appearance of a new journal under the above title is announced, under the editorial management of Dr. Lyons, who will doubtless keep it abreast of the best interests of American pharmacy and

pharmacy in general, and with this view has our best wishes for substantial success. When the publisher's announcement states the belief "that the field of pharmaceutical journalism is not yet fully occupied," this was probably intended for cutting sarcasm; for which other civilized nation on the face of the globe can boast of so many "pharmaceutical journals" in proportion to the inhabitants, Indians included?

The above was written for our January number, but with other matters was crowded out. The first number of the new journal has in the meantime made its appearance and fully sustains the expectations expressed above.

An Ephemeris of Materia Medica, Pharmacy, Therapeutics and collateral information. By Edward R. Squibb, M. D., Edward H. Squibb, S. B., M. D., and Chas. F. Squibb, A. B. Brooklyn, N. Y.

A year ago we announced with regret the discontinuance of this excellent publication, but expressed the hope that this might be only temporary. We are pleased to announce now that the first number of the third volume has been published in January, and that Dr. Squibb intends to continue to prepare material for publication as time and circumstances may permit, and whenever such may be in readiness, to offer it in this form, even if that should only be once or twice in a year.

Sixième Congrès International Pharmaceutique., tenu à Bruxelles du 31 Août au 6 Septembre, 1885. Compte rendu par E. Van de Vyvere, Secrétaire-général. Bruxelles: Henry Lamertin, 1886. 8vo., pp. 1244.

Sixth International Pharmaceutical Congress, held in Brussels, from August 31 to September 6, 1885. Report by E Van de Vyvere, general secretary.

This voluminous report, which was published in Europe last summer, has at last reached the United States. The volume is handsomely printed and contains a full account of the work done by the Congress, including all the reports, papers read, discussions, etc. It is printed in the French language with the exception of the draft of an International Pharmacopœia which is in Latin, while the prefatory and explanatory notice has been written by Mr. von Waldheim in both the German and French languages. An account of the Proceedings will be found in the October number of this Journal, 1885, p. 525.

Proceedings of the Eighth Annual Meeting of the Missouri State Pharmaceutical Association, held in Sweet Springs, Brownsville, June, 1886. St. Louis: 8vo, pp. 115.

An account of this meeting will be found on page 360 of July number, 1886.

Chemical Lecture Notes, taken from Prof. C. O. Curtman's lectures at the St. Louis College of Pharmacy. By H. M. Whelpley, Ph. G., etc. St. Louis: published by the author. pp. 143. Price, \$1.

This little volume serves a good and useful purpose as brief notes of the salient facts, connected with chemical physics and with the chemistry of non-metallic elements, and which are well adapted for reference by students studying the branches.

Principles of General Pharmacy, with special references to systems of weights and measures, specific gravity and its uses, pharmaceutical manipulations; pursuant to a course of Adolphus Fennel, Professor, etc.; compiled by Ch. T. P. Fennel, Ph. G., Professor of Practical Pharmacy and Instructor in the Pharmaceutical Laboratory in the Cincinnati College of Pharmacy. Cincinnati: McDonald & Eick, 1886. Svo, pp. 124.

This is an outline of a course of lectures on pharmacy, commencing with an explanation of prescriptions, and then treating of weights and measures in their various relations; after a definition of the various physical forces the different pharmaceutical manipulations are considered, and, finally, the different classes of pharmaceutical preparations. The little work is well adapted as a note book on such a course of lectures.

Gmelin-Kraut's Handbuch der Chemie. Anorganische Chemie. Sechste umgearbeitete Auflage. Zweiter Band, erste Abtheilung. Heidelberg: Carl Winter's Universitätsbuchhandlung. 1886.

Gmelin-Kraut's Handbook of Chemistry. Anorganic chemistry. Sixth edition, rewritten. Price of each number 1½ Mark.

We are much pleased to announce that after a lapse of several years the first part of the second volume has been completed, forming with the table of contents, a stately volume of 960 pages. We have previously stated that the work is issued in numbers, sixteen of which were necessary for the present one containing the metals of the alkalies, alkaline earths and earths. The last three numbers are devoted to the compounds of silicium, including most of the minerals of which this element forms an intrinsic constituent, and to the chemistry of glass. The last eleven pages contain corrections and additions to the preceding pages of the volume.

This comprehensive work in its latest edition is now completed with the exception of the chemistry of arsenic, antimony, tellurium and bismuth. The first volume, published in two parts, contains chemical physics (886 pages) and non-metallic elements (580 pages); and the third volume (1376 pages) the chemistry of the heavy metals. Of the second part of the second volume, eight numbers (528 pages) have appeared, bringing this portion nearly to the end of the manganese compounds. The revision of this part has been undertaken by Prof. Jörgensen of the Polytechnikum in Copenhagen, and it is to be hoped that the manuscript may be sufficiently advanced to enable the publishers to lay this grand work, completed, into the hands of chemists without great delay.

Ueber Wirkung, therapeutischen Werth und Gebrauch des neuen Karlsbader Quellsalzes nebst dessen Beziehung zum Karlsbader Thermalwasser. Von Dr. W. Jaworski, Universitäts-Dozenten in Krakau. Selbstverlag des Verfassers. Large 4°, pp. 33.

On the action, therapeutic value and use of the new Karlsbad spring salt, and its relation to the Karlsbad thermal water. Published by the author, Prof. Dr. W. Jaworski of Cracow, Austria.

The pamphlet is a reprint from the *Wiener Medizinische Wochenschrift*, 1886, and is mainly devoted to experimental investigations made in the clinic

of Prof. Korczynski in Cracow, with the view of determining the effect of the salt, under various conditions, upon the stools and upon the functions of the stomach, with the clinical deductions based upon the previous observations. The proper application of this salt is then discussed; it is compared in composition and effect with the natural spring-water, and the manner is shown in which the use of the two may be advantageously combined.

The process for preparing this new Karlsbad spring salt was elaborated by Professors Ludwig and Mauthner in 1880, and is now conducted under the supervision of Dr. Sipöcz in the manner briefly described in AMER. JOURN. PHAR. 1882, p. 408. The sprudel-water is boiled, the precipitate (consisting of silica, alumina, and the carbonates of calcium, magnesium, iron and manganese) is filtered off, the filtrate evaporated, and the saline residue, still containing several per cent. of water, is saturated with carbonic acid gas derived from the spring. The average composition, which is stated to vary not over two per cent. for the principal constituents, is as follows: sodium sulphate 43.25, sodium hydrocarbonate 36.29, sodium chloride 16.81, potassium sulphate 3.06, lithium hydrocarbonate 0.39, sodium fluoride 0.09, sodium borate 0.07, silicic anhydride 0.03, ferric oxide 0.01 (see also AMER. JOUR. PHAR. 1882, p. 408; 1883, p. 130).

American Medical Plants, an illustrated and descriptive guide to American plants. By C. F. Millspaugh, M. D. New York and Philadelphia: Boericke & Tafel, Fascicle V (Nos. 21 to 25). Price \$5.

The indigenous North American plants described in this fascicle are *Aesculus glabra*, *Ambrosia artemisiifolia*, *Argemone mexicana*, *Arisæma Dracontium*, *Collinsonia canadensis*, *Chamælrirum luteum*, *Euphorbia hypericifolia*, *Helianthemum canadense*, *Humulus Lupulus*, *Hydrophyllum virginicum*, *Lachnanthes tinctoria*, *Lactuca canadensis*, *Leptandra virginica*, *Lilium superbum*, *Lycopus virginicus*, *Penthorum sedoides*, *Ptelea trifoliata*, *Polygonum acre* and *Ranunculus sceleratus*. The following plants are naturalized, adventive or cultivated: *Anagallis arvensis*, *Artemisia Absinthium*, *Artem. vulgaris*, *Chenopodium anthelminticum*, *Convolvulus arvensis*, *Euphorbia Lathyris*, *Hypericum perforatum*, *Phaseolus vulgaris*, *Salix purpurea*, *Sinapis alba* and *Solanum nigrum*. The plates are well executed, and the characters of the plants are usually fully indicated; of *Chenopodium* and perhaps of one or two other plants, a more characteristic figure would have been acceptable.

Of the more important inaccuracies in the text the following deserve to be mentioned: *Oleum hyperici* is not a constituent of St. John's wort, but an oleoinfusion colored red by the coloring matter probably contained in the black dots. The root of *Artemisia vulgaris* has been repeatedly analyzed since 1826; but a new analysis is desirable. *Thridace* is not *lactucarium*, but is an extract obtained by expressing cultivated lettuce. Although we have shown, twenty years ago, that an efficient *lactucarium* may be prepared from *Lactuca canadensis*, and W. Hiland Flowers in 1879 proved this to have the same constituents as European *lactucarium*, we are not aware that the American plant is utilized for preparing *lactucarium*.

The Blue and Gold Handbook of the University of California. W. J. Baktnett, 1887, General Manager, San Francisco; Pavot, Upham & Co., 8°, pp. 124.

The pamphlet contains historical sketches of the University and its professors, descriptions of its museum, library, art gallery and observatory, and reports of the schools of law, medicine, dentistry and pharmacy, the latter being the California College of Pharmacy.

Journal and Programme of the Chicago Drug Clerks Association for 1887, 8vo.

Mutual improvement, fostering amicable relations with the employers, shortening the excessive hours of labor, and social intercourse appear to be the main objects of the Association.

Proceedings of the American Pharmaceutical Association at the thirty-fourth annual meeting held at Providence R. I., September 1886; also the Constitution, By-laws and Roll of its members. Philadelphia. Published by the American Pharmaceutical Association, 1886. 8vo., pp. 773.

The present volume was sent out January 14 and 15, within two weeks of the time fixed by resolution of the Association. It opens with the reports of standing committees, followed by the papers, presented to and read at the meeting; the minutes of the several sessions; the preliminary draft of a national formulary of unofficinal preparations; the report on the progress of pharmacy during the past year, and the usual appendix, containing various lists, the constitution and by-laws, roll of members and index. The preliminary matter contains the preface, table of contents, list of queries and the lists of officers and authorized agents. The list of officers since the organization in 1852 has been rearranged and now gives also date and place of each annual meeting. A phototype of the late Professor Edward S. Wayne accompanies the volume, and it is stated that he inaugurated the reading of scientific papers before this Association in 1855, by presenting an essay on the growth and production of wines in the West, and on Catawba brandy and tartar.

Non-members may obtain bound copies of the volume from the Permanent Secretary, at \$6, which includes postage.

THE AMERICAN JOURNAL OF PHARMACY.

MARCH, 1887.

MEMOIR OF SAMUEL F. TROTH.

(Read at a meeting of the Board of Trustees of the College, February 1, 1887.)

Samuel Forthergill Troth—an old and esteemed member of this College—deceased at his residence, 1019 Cherry Street, on the 18th of November, 1886, in the eighty-sixth year of his age.

The life of Samuel F. Troth, commencing near the advent of the present century, extended through a period of years which have revolutionized old customs in business, by the introduction of steam and electricity as factors in common use. Retaining an unclouded memory of the past, and continuing his interest in the advancement of pharmacy to the close of a long life, he has been affectionately regarded as a connecting bond between the present and the early history of the drug business in Philadelphia.

The ancestors of Samuel F. Troth were members of the Society of Friends (Quakers) who emigrated from their homes in England, on account of persecution, and sought, in the colony founded by Lord Baltimore, that freedom in the enjoyment of their customs and mode of worship which was denied them in their native land.

Samuel F. Troth was the youngest child of Samuel and Ann Berry Troth; he was born while his parents resided on a farm near Easton, in Maryland, May 7, 1801.

In early life—as a child—he possessed a gentle and amiable disposition, qualities which gave him an influence over his boyhood companions, among whom he acquired the title of “the little peace-maker.” During the course of a long life this trait of early character never deserted him, and in his manhood men acknowledged the perception of the boys.

The father of Samuel F. Troth appears to have been a man whose intellectual necessities were not satisfied by the routine of a farmer's life ; when Samuel was about five years old he removed to the town of Easton and opened a school, which was continued by him until his death in 1815.

To a delicate and sensitive boy of fourteen, carefully nurtured in religious thought and habits after the custom of the Society of Friends, the loss of his father produced a profound impression, and confirmed in him a reliance in a supervision beyond his own to direct and protect his course through life.

In the summer of 1816 he accompanied his mother to Philadelphia on a visit to relatives residing in this city, intending to return after a few weeks to his home in Maryland. An unexpected event, however, changed his course, and shaped the business career of his life. His elder brother, Henry Troth, with his brother-in-law, Edward Needles, had entered into a partnership for conducting a wholesale and retail drug business, on the south side of Market Street east of Seventh.

Samuel had not shown any inclination or desire for the business ; but as he was about to leave the city, the earnest desire of his brother Henry, that he might be with him, prevailed over his inclinations for another pursuit, and he consented to remain as an apprentice to the drug business with the firm. His great regret in thus early accepting the position was that it deprived him from farther opportunities of school education.

As was the custom in those days, the store and the dwelling were under the same roof, the change from a rural home to the close confinement of the store was severely felt by the slight and delicate boy of fifteen.

With his natural cheerfulness, he assumed his new duties with a determination to acquire the knowledge which would make him a master of his business, and also to supply, as far as possible, the loss sustained in leaving school, by a course of reading and study, and by availing himself of the opportunity of attending such lectures as would advance his general education.

His duty was to have the store open at sunrise, and the labors of the day did not close until ten at night ; the opportunities for study, under such circumstances, were limited to the hours given for recreation, and at night in the store. After the fatigue of the day's work, he said he was so weary that if he sat down to read he was apt to

become sleepy, and on that account adopted the habit of standing up to read or study.

While an apprentice he was much interested in the endeavors of his brother Henry, and other prominent druggists, which lead to the founding of the Philadelphia College of Pharmacy in 1821. He attended the first course of lectures given in the college in 1821-22, as also the second course in 1822-23. Although regulations were adopted by the Trustees of the college in December, 1822, in reference to conferring a diploma on graduates of the college, a draft of a form for the diploma was not presented until February, 1826, notice was given in May following that an examination would be held on the last Monday in June, at which time applicants for graduation were to present themselves. Three names were reported to the Trustees, upon whom the title of "Graduate in the Philadelphia College of Pharmacy" was conferred. Diplomas were directed to be engrossed for these. In June, 1828, a copper plate for the diploma, with an impression from the same was presented at a meeting of the Trustees by a committee to whom the subject had been referred.

The foregoing sketch of the history of the college will explain the cause of the name of Samuel F. Troth not being found among the graduates of the institution; as an active member, and for a long course of years one of the trustees of the college, his interest in its prosperity was evidenced by his untiring exertions to promote its stability and usefulness.

Soon after attaining his majority, he became the junior partner in the firm of Henry Troth & Co. A few years later Edward Needles withdrew from the firm, preferring to be engaged in the retail and dispensing business. Selecting the location at the S. W. corner of Race and Twelfth Streets, he built a store which for more than sixty years was conducted under the same name.

The friends of Edward Needles expressed surprise that he should have gone so far out of town, and called him the frontier druggist. The opposite side of Race street, above Twelfth street, was then an open field, enclosed only by a post and rail fence. The foresight of the "frontier druggist" was soon made apparent by the rapid growth of the city in that direction.

By careful economy the brothers Troth were able, in 1836, to purchase the lot adjoining them on the west, and erected the building, No. 224, old number, afterwards changed to No. 630 Market street.

This was said to be the first five story store on Market street used exclusively by one firm in their business, and although soon surpassed by buildings of greater pretensions, it created much comment at the time.

The character of the drug business then was very different from its present condition; for the greater part of manufactured articles the market was dependant upon importations, chiefly from Great Britain.

He took great interest in the progress of chemical manufacturing in Philadelphia, and often referred to his satisfaction in being able to obtain these products from the laboratories of our own city, then in their infancy, but afterwards to become so well renowned for the excellence of their preparations.

The firm of Henry Troth & Co., received the first large shipment of petroleum, called at that time Seneca Oil, made to this city; this consignment of eight or ten barrels was considered by their friends as a venturesome risk; they were, however, able to dispose of it for use as a medicinal agent, its value for other purposes remaining for future discovery.

In the spring of 1842, Samuel F. Troth met with a severe affliction in the death of his brother Henry. For himself he had not anticipated a long life, and the decease of his brother so much more active and vigorous than himself, was unexpected. Sorrow and the anxieties connected with the business which now rested alone on him, were telling upon his health which was not robust; his medical adviser, Dr. Theophilus Beesley, to whom he applied for advice, informed him that he had no physical ailment needing medicine, and advised him to endeavor to throw aside the depression of spirit, and the care of business on leaving his store, by having at home some interesting book from which to read aloud to his family during the evenings. This moral treatment was found to be of great benefit to his health, and proved a lasting pleasure to the home circle where it was continued for more than forty years.

A few years after the death of his brother, he took into partnership his nephew, William P. Troth, and afterwards, Henry M. Troth, both sons of his brother Henry.

In 1853 his health made it necessary for him to retire from active participation in business, and at the earnest solicitation of his family he relinquished the drug business to his nephews.

His active mind could not settle down into inactivity, and as far as his strength would permit, he exerted himself in works designed for the benefit of others.

The Apprentices' Library, and the Philadelphia College of Pharmacy, were two institutions which enlisted a large share of his earnest interest. His own experience created a deep sympathy for those who were obliged in early life to depend upon their own exertions; to young strangers, especially, coming to a large city, he was ever ready to give advice and assistance.

Increasing years, and decreasing strength, made it at last necessary for him to relinquish all the duties which had so long been an attraction to him. His mind retained its clearness of perception, and his interest remained unabated in all affairs relating to the well-being of his fellow men. At the age of 85, he was frequently requested to furnish statistical and other information on important subjects, and was able to do so with great clearness.

In 1874, he furnished an interesting article for the American Journal of Pharmacy, on "Pharmacy Fifty Years Ago," and in 1879, an article on "The Early Price of Quinia."

He was elected a member of the Philadelphia College of Pharmacy in 1822, and served the college as its Treasurer from 1838 to 1842, when he resigned that position, and was elected a Trustee, remaining in the Board of Trustees nearly the whole of his subsequent life. In 1845, he was made Vice President of the college, and continued as such until his failing health induced him to decline its continuance.

The dignified simplicity of his manner, the cheerful and open expression of his countenance which evinced the kindly sentiments of his heart, were well calculated to attract and gain the confidence of all who sought his counsel, and to endear him to all his acquaintance and personal friends.

While a consistent member of the Society of Friends, he manifested an unsectarian interest for all holding the doctrines of Christian faith.

Until within a few days of his death, he was able to occupy his accustomed place in the family circle; after an illness of five days, unaccompanied by suffering, he closed the record of an honored and useful life.

C. B.

BISMUTH OXYIODIDE.

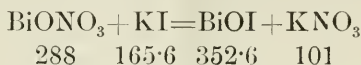
BY FRANK N. MOERK.

(Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.)
Read at the Pharmaceutical Meeting, February 22nd.

The processes published in the AM. JOURN. OF PHARM. December, 1886, and January, 1887, for the preparation of bismuth oxyiodide are supposed to yield a product having the formula BiOI.

Both methods advocate the use of considerable mineral acid; that of Mr. C. Mayo, hydrochloric, and that of Mr. Jos. W. England, nitric acid. Both products are mixtures of bismuth oxyiodide—with oxychloride in the former, and oxynitrate in the latter case.

It occurred to me, on reading the papers above referred to, that a pure oxyiodide might be made by boiling together oxynitrate of bismuth and potassium iodide, according to the reaction:



The two salts, dried at 120° C., were taken in molecular ratio—10 gm. of the former, 5.75 gm. of the latter—and boiled with 50 cc. water for half an hour. The color of the oxynitrate at once changed to a yellow, and rapidly passed into a brick-red. It is not necessary to boil the mixture in order to get the brick-red precipitate, since the reaction also takes place in the cold, although much slower, requiring several hours for its completion. The precipitate was transferred to a weighed filter and washed with boiling water until the washings ceased to produce turbidity with silver nitrate. It was then dried at 120° C., and weighed. The weight was 11.490 gm.—deficient, as the theoretical yield is 12.243 gm.

The filtrate, proven to be free from Bi, contained a large quantity of potassium iodide, which on estimation by precipitation with silver nitrate and weighing as AgI, proved to be 33 per cent. of the amount of potassium iodide taken, indicating that only two-thirds of it entered into the reaction. The product contained oxynitrate, the detection of which in the presence of an iodide is rather difficult, and is best determined by reducing the nitric acid to ammonia by generating H from Zn and H₂SO₄ and liberating NH₃ by adding KOH. The purity of the compound was established by igniting 2 gm. until the oxide, Bi₂O₃, which results on ignition in air, ceases to lose weight. This cannot be accomplished by heating with a Bunsen burner, as some of the iodine is still retained after several hours' heating. By the use of a blast-lamp, after heating with a Bunsen burner, additional vapors of iodine are evolved, and the residue, only after complete fusion, ceases to lose weight. The amount of Bi₂O₃ was 1.414 gm., or 70.70 per cent.

The Bi₂O₃ yielded by BiOI is equal to 66.36 per cent.; therefore, the compound is not pure BiOI as previously indicated by the detec-

tion of nitric acid. The excess of Bi_2O_3 , 70.70—66.36 or 4.34 per cent., is due to the presence of an equivalent quantity of BiONO_3 , which gives 81.25 per cent., Bi_2O_3 .

The salts used in the preparation were carefully tested for impurities and were found to be pure, so that BiONO_3 is the only possible contamination.

From the percentages of oxides can be calculated the percentage of BiOI and BiONO_3 in the compound.

A=1 part of the preparation.

B= Bi_2O_3 from one part 0.707

I= Bi_2O_3 " " " BiOI 0.6636

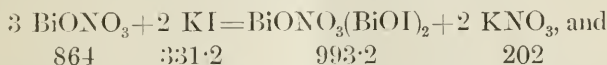
N= Bi_2O_3 " " " BiONO_3 0.8125

x and y represent unknown quantities of BiONO_3 and BiOI respectively. Then $x+y=A$ and

$x = \frac{B-I}{N-I}$ or $0.2914=29.14$ per cent. BiONO_3

$y=A-x$ or $0.7086=70.86$ per cent. BiOI .

By dividing the percentage composition by the molecular weights of the salts, the figures 1.01 and 2.009 are gotten, showing that the compound is composed of one molecule BiONO_3 and two molecules BiOI . This explains for only two-thirds of the potassium iodide taken entering into the reaction, which can now be written,



by a calculation as to the yield of $\text{BiONO}_3(\text{BiOI})_2$ from 10 gm. BiONO_3 there is gotten 11.495 gm. The quantity obtained (Specimen A2) was 11.495 gm., agreeing with the above figures.

The above reaction occurs, no matter how great the excess of KI used, and if the resulting product be thoroughly washed and boiled with an additional quantity of KI , it only slightly deepens in color (Specimen A3), without assuming the color and crystalline form so characteristic of pure BiOI .

Thinking that BiOI could be made by the first reaction when carried out under pressure, the following experiments were made:

1. 5 gm. BiONO_3 and 2 gm. KI with 10 cc. water,
2. 5 gm. BiONO_3 and 3 gm. KI with 10 cc. water,
3. 5 gm. $\text{BiONO}_3(\text{BiOI})_2$ and 3 gm. KI with 10 cc. water

were heated in sealed tubes for two hours at a temperature of 150°C . On examining the products, they were not found to differ from those

gotten by carrying out parallel experiments under normal pressure. These sealed tube experiments were not made until BiOI had been obtained by methods to be described further on.

The medicinal virtues attributed to the oxyiodide of bismuth really belong to mixtures of oxyiodide and oxynitrate, pure oxyiodide of bismuth having as yet not been used in medicine. A formula is given for the preparation of $\text{BiONO}_3(\text{BiOI})_2$, with the advantages of the product.

Bismuth subnitrate,	10 gm.
Potassium iodide,	4 gm.
Water,	50 cc.

Boil for 30 minutes, filter and wash the precipitate until the washings no longer produce turbidity with solution of silver nitrate. Dry, first by pressing between bibulous paper, and then at 120°C .

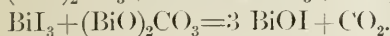
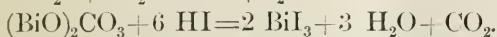
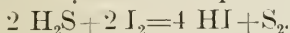
The advantages of this product are: First, the avoidance of free acid; Second, its definite composition; Third, a higher percentage of BiOI than is obtained by either of the published processes.

A specimen is presented which was made by boiling the above quantities for only a few minutes, the composition of which is BiONO_3 44.59 per cent., BiOI 55.41 per cent., showing an incomplete change. It may here be stated that the percentage of BiONO_3 in specimens gotten by the above process, can be determined by subtracting 66.36 from the percentage of Bi_2O_3 , multiplying by 100 and dividing by 14.89.

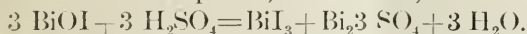
Having failed in the above experiments, as far as the preparation of a pure oxyiodide of bismuth is concerned, attention was now paid to the action of potassium iodide on bismuth oxycarbonate. The two salts can be boiled together for a long time without reaction. If to the mixture acetic acid be added, effervescence takes place, the color rapidly changes to a red-brown and on continued boiling the salt becomes crystalline. The compound in this case is not definite in composition, from 60 to 80 per cent. of the oxycarbonate being changed into oxyiodide. If the compound so gotten be thoroughly washed and then boiled a second time with potassium iodide and acetic acid, effervescence again occurs and the color of the precipitate becomes darker (Spec. B1.) This on analysis—by ignition 67 per cent. Bi_2O_3 is obtained—contains 98 per cent. BiOI. When this is boiled with KI and acetic acid, a product (Spec. B2) is gotten, leaving 66.50 per cent. Bi_2O_3 on ignition, corresponding to 99.50 per cent. BiOI.

The process is a tedious and expensive one, and is only given to prove that the repeated action of KI and $\text{HC}_2\text{H}_3\text{O}_2$ on $(\text{BiO})_2\text{CO}_2$ will give a pure oxyiodide.

The pure salt, BiOI, was obtained by the action of III on $(\text{BiO})_2\text{CO}_3$. Hydriodic acid was made by the action of H_2S on I, in presence of water; after the complete conversion of I into HI, the solution is boiled until the aqueous vapor no longer darkens acetate of lead paper. To this solution is then added the oxycarbonate in small consecutive portions. It is first dissolved to a yellowish-red solution, CO_2 being liberated, and then on further addition there is precipitated the normal iodide BiI_3 . This is changed by boiling with the $(\text{BiO})_2\text{CO}_3$ into BiOI. There is no difficulty in avoiding an excess of the oxycarbonate if the color of the supernatant liquid be watched, for as long as it is colored there is present free hydriodic acid. The addition of $(\text{BiO})_2\text{CO}_3$ must cease as soon as the liquid assumes a pale yellow color (Spec. C1). The product yields 66.40 per cent. Bi_2O_3 . The reactions are as follows:



Every atom of iodine is converted into one molecule of BiOI. To make, for example, 30 gm. BiOI, 10.77 gm. iodine and 22.55 gm. oxycarbonate of bismuth are required. For the preparation of it, there may be taken one part iodine and two parts oxycarbonate, which will give almost three parts BiOI. The preparation thus obtained has a copper-red or chocolate color, is crystalline, soluble in strong HCl without liberation of I; HNO_3 liberates iodine, forming $\text{Bi}(\text{NO}_3)_3$. Dilute acids decompose it, forming BiI_3 and the corresponding salt. The action of dilute sulphuric, for instance, is:



BiOI was obtained by Schneider (Watts' Dictionary) by heating BiI_3 in air. It can also be obtained by boiling the normal iodide with a large excess of water. $\text{BiI}_3 + \text{H}_2\text{O} = \text{BiOI} + (\text{HI})_2$. This is a costly method, as two-thirds of the iodine present is liberated as hydriodic acid, holding in solution some of the bismuth. (Spec. C2.)

A sample of oxyiodide (Spec. C3) is presented, made by concentrating the hydriodic acid, liberated as above, and adding oxycarbonate.

The three specimens of pure oxyiodide are identical in appearance and properties. C1, however, is in larger crystals, due perhaps to the fact that the hydriodic acid used was more concentrated than that from which Spec. C3 was prepared.

It may be of great interest and importance to know if pure oxyiodide of bismuth has properties similar to those possessed by mixtures of oxyiodide and oxynitrate, or if the virtues possessed by the mixtures depend on the presence of oxynitrate.

ANALYSIS OF HYDRANGEA ARBORESCENS.

By C. S. BONDURANT.

Read at the Pharmaceutical Meeting, February 22.

This indigenous plant grows abundantly in a large section of the United States. Considerable quantities are furnished to the market from Ohio and Indiana. *Hydrangea* is well known by its vernacular name "Seven Barks," and is said to have been used by the Cherokee Indians and subsequently by more scientific practitioners, some of whom regarded it as a specific in treatment of urinary calculi.

As far as I am able to learn *hydrangea* has received but little attention as to its proximate constituents.

The first analysis was probably that of Mr. Jos. Laidley, of Richmond, Va., in 1850. He mentions having found only gum, starch and resin.

The AMER. JOUR. OF PHAR., of April, 1881, p. 157, contains an essay by Mr. Jacob Baur, Ph. G., who claims to have found in addition to gum, starch, resin and sugar, an alkaloid in small quantity and tannin, also a crystallizable body, but was unable to separate a sufficient amount to determine its character.

In following the scheme outlined by Dragendorff, for plant analysis, I found a distinctly crystalline body in both alcoholic and ethereal extracts, the latter containing the largest quantity. Its extraction and purification was attended with much difficulty, owing to the fact of its readily undergoing decomposition, which was accompanied by a resin-like body, possessing an odor entirely different from that characteristic of the drug.

A portion of the body, distinctly crystalline and freed from decomposition products, by solution and recrystallization from ether, was examined as to its chemical relations. The alkaloidal reagents were applied, none of which gave any evidence of alkaloidal character. After boiling an aqueous solution of the body with dilute hydrochloric acid and neutralizing with potassium hydrate, Fehling's solution was promptly reduced. Its behavior to Fehling's solution and the proneness to decomposition into the resin-like body and glucose, are sufficient evidence of its being a glucoside.

In order to obtain a larger quantity 500 grams of the drug were prepared and percolated to exhaustion with 95 per cent. alcohol. The greater portion of the alcohol being recovered by distillation, the concentrated extract was allowed to evaporate spontaneously, which left a viscid brownish red mass. After shaking with petroleum spirit to remove a fixed and volatile oil, the residue was treated with a slightly acidulated water and chloroform to remove the red coloring matter. The acidulated solution was shaken with ether several times, the ethereal washings on evaporation deposited the body in stellate clusters in fair state of purity.



CRYSTALS OF HYDRANGIN (Natural Size).

After confirming its glucosidal character, the name *hydrangin* is proposed for it. On addition of an alkali to the aqueous solution a very distinct and strong opal blue fluorescence is observed, which is destroyed in acidifying. This characteristic fluorescent property was noticed in all the solvents used in exhausting the drug except the petroleum spirit and dilute hydrochloric acid.

From its fluorescent property it was thought to be similar to or identical with *æsculin*, a glucoside prepared from horse chestnut, but on comparison they were found to be distinct bodies. The fluorescence of hydrangin is opal blue, while that of *æsculin* is sky blue. Hydrangin also differs from *æsculin* by its ready solubility in ether, its insolubility in strong hydrochloric acid and by its not being precipitated by argentic nitrate, mercuric chloride, nor neutral lead acetate. Hydrangin is not charred by concentrated sulphuric acid, but dissolves without color; also with nitric acid. A characteristic reaction for hydrangin is obtained on dissolving it in sulphuric acid and adding a small crystal of potassium bichromate when a dark purple color is produced which, after some minutes, fades to violet; and on addition of a few drops of water an olive green is produced which gradually fades.

Hydrangin melts at 235° C. and on increasing the temperature slightly, sublimes without decomposition, forming in stellate clusters,

without color. It was desired to make an ultimate analysis of hydrangin, but owing to lack of time it will be reserved for future investigation.

In exhausting the drug with the usual solvents, there was found in the petroleum spirit extract, a fixed oil, turning dark reddish-brown with concentrated sulphuric acid, saponifiable with potassa; and a volatile oil possessing the characteristic odor of the drug and evolving an alliaceous odor when treated with caustic potash and sulphuric acid. The presence of sulphur was indicated by the blackening of paper moistened with solution of lead acetate.

The ethereal extract contained in addition to the glucoside, a resin insoluble in water, sparingly soluble in chloroform, completely soluble in absolute alcohol and alkaline solutions.

Absolute alcohol extracted the glucoside, a resin insoluble in ether, and a reddish coloring matter soluble in chloroform.

Water extracted vegetable mucilage, saponin and sugar.

The dilute soda solution contained mucilaginous substances and albuminoids.

Dilute hydrochloric acid extracted calcium oxalate in small quantities.

The residue boiled with dilute hydrochloric acid for some hours extracted starch by conversion into glucose.

Lignin was extracted by chlorine water with agitation.

The ash was found to be composed of sulphates, chlorides, carbonates, phosphates and silicates combined with calcium, iron, aluminium, magnesium and potassium.

SUMMARY :

Petroleum spirit (fixed and vol. oil).	2.28	per cent.
Stronger ether (glucoside and resin).....	1.57	"
Absolute alcohol (glucoside and two resins).....	2.31	"
Distilled water (mucilage, saponin and sugar).....	9.52	"
Dilute soda (mucilage and albuminoids).....	8.37	"
Dilute hydrochloric acid (calcium oxalate).....	1.40	"
Starch,.....	7.28	"
Lignin,.....	4.83	"
Ash,.....	3.41	"
Cellulose moisture, etc., undetermined,	59.03	"

Total, 100.00

No tannin was found to be present in the drug contradictory to statement made by Mr. Baur. The work above was done in the laboratory of the Philadelphia College of Pharmacy, under direction of Prof. Henry Trimble.

EXAMINATION OF CHIMAPHILA UMBELLATA.

By E. S. BESHORE.

Read at the Pharmaceutical Meeting, February 22.

The leaves of *Chimaphila umbellata*, *Nuttall*. Nat: Ord: Ericaceæ, Pyroleæ.

Chimaphila umbellata is indigenous to North America, Northern Asia, and Northern and Central Europe, is found in dry woods and flowers in June and July.

Moisture.—The amount of moisture was found to be 7.83 per cent.

Ash.—Upon ignition, the leaves yielded 4.04 per cent. of ash.

Treatment with Petroleum Spirit.—The leaves freed from the accompanying stems, were reduced to a No. 80 powder, and 50 gm. of the powder was exhausted by petroleum spirit, boiling point 45°C.

The liquid was concentrated to a definite volume, to ascertain the percentage soluble in this menstruum, which was found to be 3.92 per cent.

Crystalline Principle.—The remaining liquid was allowed to evaporate spontaneously; when the extract became concentrated, to about 200 cc. I noticed a white crystalline principle separating and collecting at the bottom of the beaker. After concentrating to about 75 cc. I separated the extract from the crystals by decantation, as they were then yet practically free from impurities; and after trying various methods to obtain them in an entire state of purity, I adopted the following method:

Treated them with 90 per cent. alcohol, to remove traces of adhering chlorophyll, followed by treatment with absolute alcohol, and finally by dissolving in boiling chloroform, when, upon cooling, the crystals will separate in a state of purity.

With a view of making a further investigation of this crystalline principle, two and a half kilos of the drug were percolated with petroleum spirit, which, after purification, yielded a sufficient amount of crystals to make two ultimate analyses with the following results, which indicated a formula very close to $C_{10}H_{19}O$.

Found.

Calculated percentage for

Found.		Calculated percentage for
1st.	2nd.	$C_{10}H_{19}O$.
C 77.87	77.67	77.42
H 12.14	12.21	12.90
O 9.99	10.32	10.32

The crystals melt at 236° C. (difference from urson which melts at 190° C.); they can be sublimed at a temperature below the melting point if the heat is applied long enough, and they finally carbonize at 278° C. They are sparingly soluble in cold or boiling 90 per cent. alcohol, sparingly soluble in absolute alcohol, stronger ether, benzol, chloroform, and glacial acetic acid, and precipitated on diluting with water; more freely soluble in hot glacial acetic acid. Bromine has a decided action on them and appears to form bromine derivatives.

When pure they do not give any color reaction with nitric acid, (difference from urson), but slowly dissolve in the acid. Strong sulphuric acid does not carbonize them, nor is the acid colored, which will serve as a chemical test by which they may be distinguished from urson, the latter being carbonized by strong sulphuric acid, and the acid colored red. Like urson, they are tasteless and odorless, when pure. They are not well crystallized from stronger ether. The most perfect crystallization may probably be obtained from a solution in chloroform.

I also distilled with water, some leaves of *chimaphila*, practically free from stems; upon shaking the distillate with petroleum spirit, and evaporating the latter, golden-yellow, flaky crystals were obtained, the yellow appearance probably due to impurities; these crystals are freely soluble in chloroform, alcohol and ether, insoluble in water, colored blood red by sulphuric acid, the color being changed on the addition of bichromate of potassium to yellow, then green, which appears to be permanent; on the addition of nitric acid the blood red color is changed to yellow. Upon distilling with water the stems, the same principle was obtained.

This compound, obtained by distillation, was first made mention of by Mr. Samuel Fairbank (in the *Journ. and Trans. of the Md. Col. of Pharm.*, March, 1860), but it appears to be distinct from the one obtained by the action on the drug with petroleum spirit, in the following respects:—1st. In their physical properties, the crystals being of yellow and flaky appearance and freely soluble in most simple solvents; on the other hand, those obtained by the action on the drug with petroleum spirit are purely white, and the crystals have an acicular appearance. 2d. In the chemical behavior they differ by forming color reactions with sulphuric acid, with sulphuric acid and bichromate of potassium, and with sulphuric followed by nitric acid. Those obtained by the action on the drug with petroleum spirit do not produce any color reaction with the above reagents.

A READY METHOD FOR THE ASSAY OF LAUDANUM.

BY CHARLES BULLOCK.

The resinous matter taken up by dilute alcohol from opium presents an obstacle in the determination of the morphia contained in the tincture. The following simple process was found to work well, and gave satisfactory results.

The tincture is evaporated on a water bath at a low heat to about one-fourth of its volume, to the fluid extract thus obtained pure kaolin is stirred in until a thick paste is formed; water is then added gradually with constant stirring to make an homogeneous mixture; this is transferred to a wet filter and after the liquid has drained through, the contents of the filter are washed with water until the filtrate is clear and without bitterness.

The solution first draining through the filter is set aside, and the washings are evaporated on a water-bath, and added to the reserved portion. The separation of the morphia is then effected after the process of Dr. E. R. Squibb.

The kaolin separates the resinous matter in a finely divided condition and permits the soluble salts to be washed out without difficulty.

GLEANINGS FROM FOREIGN JOURNALS.

BY GEO. H. OCHSE, PH.G.

Eugenol as an antiseptic.—Eugenol the principal component of oil of cloves is found also in *Myrtus Pimenta* (*Pimenta officinalis*, *Lindley*), *Amomis acris*, *Berg* (*Myrcia acris*, *DeC.*), *Canella alba*, *Murray*, *Diocypellium caryophyllatum*, *Nees*, and in *Ravensara aromatica*,

Sonnerat. Eugenol $C_{10}H_{12}O_2 = C_6H_5 \left\{ \begin{array}{l} OCH_3 \\ OH \\ CH.CH.CH_3 \end{array} \right.$ —a phenol-like

compound, is insoluble in glycerin and water and is obtained as residue when oil of cloves is subjected to distillation with strong caustic alkalis. After the so-called light oil of cloves is distilled off, sulphuric or phosphoric acid is added and by continuing the distillation without access of air, eugenol is obtained. Eugenol is an oily, colorless liquid, possessing the odor and taste of oil of cloves in the highest degree. In contact with air and light it soon acquires a brown color; it boils at $247.5^\circ C.$ and has a specific gravity of 1.078 at 0 and 1.063 at 18.5°

C. Like phenol, which it resembles very much, it has no acid reaction, does not contain the group COOH and also forms crystallizable compounds with alkalis. When heated with hydriodic acid it evolves methyl-iodide, and when fused with potassium hydrate, it forms proto-catechuic acid $\text{C}_6\text{H}_3(\text{OH})_2\text{COOH}$, with baryta and tin-dust it forms about 10 per cent. methyl-eugenol. When taken internally the greater part of it is eliminated by the urine, in which however it cannot be detected by its odor nor by distillation, but, if allowed to decompose, the characteristic odor is at once perceptible, and when extracted with alcohol shows the characteristic deep-green coloration with ferric chloride. Eugenol has been given in doses of 3 grams per day dissolved in alcohol and diluted with water. As an antiseptic, it is superior to phenol; as a febrifuge, it is not as efficacious as quinine, salicylic acid, antipyrine or thalline.—*Phar. Zeitschrift für Russland*, xxv, page 723.

Preservation of ferrous sulphate.—To preserve ferrous sulphate—crystalline or precipitated—Gawalowski places in the salt an epouvrette half-filled with an alkaline solution of pyrogallie acid. The epouvrette is placed in such a way that the opening is sufficiently above the salt. With a good stopper, ferrous sulphate can be kept from two to three years.—*Ibid.*, xxv, page 759.

Iodoform pencils.—I. Iodoform powdered 50, starch (or gum arabic) 5, distilled water 9.5; make pencil 8 centimeters long and 4 millimeters thick. II. Iodoform powdered 5, starch or gum arabic 6, glycerin 9.5; make a pencil 6 centimeters long and 1 centimeter in thickness.—*Ibid.*, xxv, page 760. See also AM. JOUR. PHAR., 1885, page 30.

Naphthalin as a vermifuge.—Koriander gives children from 1 to 3 years old 0.15 to 2.0 grams twice daily; to adults he gives from 1.25 to 6.0 grams per day in powders with sugar. Koriander has frequently noticed excellent results from naphthalin when given for tape-worm.—*Phar. Zeitsch. für Russl.*, xxv, page, 786.

Impervious Shoe Blacking.—Wax 10, spermaceti 6, oil of turpentine 66, asphalt varnish 5, pulverized borax 1, nitrobenzol 1, grape-vine charcoal 5, Berlin blue 2. Melt the wax, add the borax and stir until a jelly is formed. In another vessel melt the spermaceti, add the asphalt varnish previously mixed with the turpentine, stir well and add to the wax, lastly add the coloring previously mixed with a small quantity of the mass, perfume with nitrobenzol and fill in boxes. Apply a small quantity with a rag and brush. To be used only once a week.—*Ibid.*, xxv, page, 792.

Paraffin Oil is said to be a new adulterant for cod liver oil. It can be recognized by saponification, paraffin does not saponify.—*Ibid.*, xxv, page, 792.

Antipyrine as a styptic.—Henoeque and Huchard have used antipyrine for bleeding from the nose and on wounds on the hand and fingers. They applied 0.5 grams by dusting on the wounds.—*Archiv der Pharmacie*, Dec. 1886, page, 1027.

Ointment of potassium iodide.—To mix solutions of iodide of potassium with petrolatum the *Süd Deutsche Apotheker Zeitung* recommends the addition of a small quantity of lanolin. The ointment is quickly made, is smooth, and does not separate even after standing a long time.

Urethane as an antidote to Strychnine, Pierotoxin and Resorein.—Prof. Aurep experimented on animals with urethane and found it to be antagonistic to and a counter-poison for strychnine, pierotoxin and resorein. Urethane is equally as good as chloral and is not dangerous, as large doses can be taken without affecting the circulation or respiration. To judge from the effect on dogs it would require from 8 to 12 grams of urethane to overcome strychnine poisoning in a human being.—*Ph. Post*, xix page 726.

New reaction for Hydrocyanic acid.—To the suspected liquid is added nitrite of potassium and ferric chloride acidulated with sulphuric acid and heated to near the boiling point. After the mixture has cooled the iron is precipitated by ammonia and filtered. The filtrate is tested for potassium nitro-prussiate with colorless solution of sulphide of ammonium. In a dilution of 1 part of hydrocyanic acid to 312,500 parts of water a distinct blueish-green coloration is produced.—*Ph. Post*, xix page 740.

Osmic acid.—Dr. Schapiro uses the following solution :

Osmic acid	0.455
Glycerin	14.20
Distilled water	24.60

This solution should be kept in a black bottle and if carefully sealed will keep for two or three weeks.

For neuralgic affections five drops of the above solution are injected hypodermically near the seat of pain. In some cases the injection must be renewed but does not produce any dangerous results.—*Journal de Pharm. et de Chim.* 1886, xiv, p. 519. (See also *Amer. Jour. Phar.*, 1884, page 648.)

YELLOW MERCURIC OXIDE.

By L. W. HAWKINS.

My attention was lately directed to the difficulty in obtaining pure yellow mercuric oxide. When I say pure I mean perfectly pure. No doubt most samples obtained are all that could be desired pharmaceutically. But speaking chemically, I have not come across a sample that answered either of the tests required by the British Pharmacopœia. These tests are that it should entirely volatilize when heated to incipient redness, and that it should dissolve in hydrochloric acid, by which I understand to dissolve completely.

Of seven samples obtained from different sources, each left a residue when heated to low redness. Although these residues appeared considerable in the crucible, the percentage proved very small on weighing. As was expected they were chiefly composed of sodium chloride, the bye-product in the preparation, with a little sulphate. Three of them gave evidence of a trace of potassium, and No. 2 contained a little iron, while No. 7 contained magnesium as well.

Every sample failed to dissolve entirely in dilute hydrochloric acid, the insoluble portion being a white powder. This, on being separated was found to be calomel, indicating the presence of mercurous oxide in the original powder. With dilute nitric acid a better solution was effected, but in every case there was a small amount of insoluble matter, consisting of a layer of white powder which collected on the bottom of the test tube. This at first seemed strange, as every substance found in the ash would be readily soluble in nitric acid. It soon occurred to me however that the mercurous oxide present, together with the small quantity of sodium chloride, would, in the presence of acid form mercurous chloride, which is insoluble in cold nitric acid.

By the Pharmacopœia process for the preparation of yellow mercuric oxide, 40 fluidounces of liquor sodæ are ordered, while about 27 would do the work theoretically. This excess of sodium hydrate entirely prevents the occurrence of any other compound of mercury than oxide, and also gets rid of such impurities as lead and tin, should they be present, by precipitating them as hydrates and redissolving them.

The mercurous oxide was estimated by treating a weighed amount of the sample with dilute hydrochloric acid until all the yellow color

disappeared, and nothing remained undissolved but the small quantity of mercurous chloride. This was filtered off, washed with hot water, dried at 100° C., and weighed. From this weight was calculated the percentage of mercurous oxide. The mercuric oxide was estimated by passing sulphuretted hydrogen through the filtrates obtained in the previous estimation, after nearly neutralizing them with alkali. The resulting sulphide was then separated, dried and weighed, from which weight was obtained the equivalent weight of mercuric oxide.

The following are the results of 100 parts of each sample:—

	HgO.	Hg ₂ O.	Fixed matter.
1.....	98.238	.454	.272
2.....	96.489	.895	1.007
3.....	98.174	.532	.371
4.....	98.237	.746	.416
5.....	97.692	.268	.212
6.....	96.895	.853	.954
7.....	97.787	.758	1.015

The deficits, I presume, may be attributed to moisture which was not separately estimated, except in one or two cases, as a check.

It will be seen that all these samples are very satisfactory, especially when we consider the amount of time and trouble required to wash away the last traces of a bye-product from a large quantity of a preparation.

The mercurous oxide may be due to the mercuric chloride containing some soluble mercurous salt, which is scarcely probable, or else it may form in the mercuric oxide on keeping.* A freshly made sample, prepared by myself, gave a perfectly clear solution, with dilute hydrochloric acid.—*Phar. Jour. and Trans.*, Feb. 5, 1887, p. 640.

CRYSTALLINE ACID IN URINE POSSESSING MORE POWERFUL REDUCING PROPERTIES THAN GLUCOSE.

By JOHN MARSHALL, M. D.,

Demonstrator of Chemistry, University of Pennsylvania.

In the early part of last November, Prof. Frank Donaldson, Sr., of Baltimore, sent for examination, to Prof. Tyson, of this city, a urine which contained a substance having strong reducing properties much resembling those possessed by glucose. After Prof. Tyson had finished his examination, he gave the remainder of the urine to Prof.

* On exposure to light, yellow mercuric oxide becomes dark in consequence of partial reduction to mercurous oxide. Editor A. J. P.

Wormley, for further investigation. From Prof. Wormley it came to me. From the results obtained by the three independent observers it was concluded that the reducing substance was certainly not glucose. This conclusion was at once communicated to Prof. Donaldson by Prof. Tyson, and at the same time Prof. Tyson requested that a larger quantity of urine be sent to me for further examination. This larger quantity was kindly sent by Prof. Donaldson, and arrived at the University on November 17th, and the examination was immediately continued. A few days afterward (November 21) crystals of the lead salt of the acid were obtained. Prof. Donaldson was at once informed of this result, and at the same time a few crystals of the salt were sent to him.

From Prof. Donaldson it was learned that the urine in question was voided by a man thirty-seven years of age, of florid complexion, and of average height and weight. His general health and nutrition have always been good. He has never had any muscular weakness or inordinate thirst, no emaciation, but instead a continued increase in weight, no excessive quantity of the secretions. He has always been temperate as to alcoholic stimulants. Since his seventeenth year he has been engaged in the lumber business, and at present is superintendent of a planing-mill which position requires his visiting the mill two or three times daily.

The case is peculiarly interesting, because of the man's having repeatedly, during the past two and a half years, applied to the various life insurance companies represented in Baltimore for insurance, but each time suffering rejection because of the response of his urine to certain reagents used in testing for glucose, a response which naturally was considered to be due to glucose.

Upon the ingestion of certain substances, other substances appear in the urine, which have a reducing action upon alkaline copper solutions. When camphor is ingested, camphoglycuronic acid, $C_{16}H_{24}O_8$, appears in the urine. This breaks up into glycuronic acid, $C_6H_{10}O_7$, which has a strong reducing action. Chloroform in the urine also reduces alkaline copper solution. Chloral is converted into urochloralic acid, $C_8H_{13}Cl_3O_7$. Turpentine into terpenoglycuronic acid. Morphine forms a reducing substance. Phenol (carbolic acid) and benzol form hydrochinon, $C_6H_4(OH)_2$. Phenol and benzol are also converted into oxyphenic acid (pyro-catechuic acid), $C_6H_4(OH)_2$, which latter probably is identical with the substance described by Boedeker as al-

kapton. Tannic acid is excreted as gallic acid. All these products possess the property of reducing alkaline copper solution. Hydrochinon and oxyphenic acid in the presence of an alkali, and when exposed to the air absorb oxygen, and turn first green, then brown, and, finally black.

It was learned that the person who voided the urine under examination never had occasion to use any of the above-named substances; and, therefore, one would hardly expect to find the products of their metamorphosis in the urine. It must not be forgotten, however, that oxyphenic acid has several times been found in normal urine.

The peculiar acid in question is contained in rather large quantity in this particular urine, nearly one grammic of the lead salt having been obtained from 100 cc. of the urine. Its reducing power is greater than that of glucose; 0.6 cc. of the undiluted urine was sufficient to reduce the cupric oxide in 10 cc. of Fehling's solution, equivalent to 0.05 of glucose, or, expressed in glucose units, equivalent to 8.3 per cent. of glucose.

Some of the reactions of this urine, when considerably diluted with water or with normal urine, strikingly resemble reactions often noticed in this laboratory in urine considered and acknowledged to be free from glucose, especially in the reaction with diluted Fehling's solution. With the urine containing the acid, diluted either with water or with normal urine, and diluted Fehling's solution, a brownish and sometimes greenish coloration is produced, but no appreciable reduction of the cupric oxide is observed. A similar result has often been noticed in this laboratory when a presumably normal urine has been tested with Fehling's solution.

It is quite likely that this acid may occur more frequently in urine than is suspected, probably only in less quantity than contained in the urine just referred to, and to its presence possibly may be attributed the many peculiar and unsatisfactory reactions so often noticed when testing urine with Fehling's solution. Quite likely, too, in some samples of urine, the acid may be contained in sufficient quantity to produce a reduction with Fehling's solution in such a satisfactory manner as to be mistaken for glucose, and thus many erroneous diagnoses of diabetes mellitus may have occurred.

The urine from which the acid was obtained was of a brownish red tint, perfectly clear and without sediment.

To isolate the acid the following method was employed:

The urine was treated with half its volume of plumbic tribasic acetate solution, and the resulting voluminous precipitate collected on a filter and washed several times with a mixture of equal parts of alcohol and water. The precipitate was then suspended in warm water and hydrogen sulphide passed through until all the lead was precipitated. After expelling the hydrogen sulphide from the filtrate by boiling, excess of plumbic carbonate was added, and the liquid was gently boiled several minutes, and then filtered while hot. The filtrate was concentrated on the water bath and then kept in a cool place to allow crystallization to occur. The crystals of the lead salt which separated were washed by decantation with a mixture of equal parts of alcohol and water and recrystallized from hot water. Finally, when sufficiently pure they were dissolved in hot water and the lead precipitated by hydrogen sulphide, filtered, and the filtrate containing the free acid evaporated to dryness at about 70° C. The residue was extracted with ethyl ether, and the latter evaporated spontaneously. Several recrystallizations from ether, the final one from a mixture of ether and water, are necessary to obtain the acid in a fairly pure condition. The crystal mass was pressed between bibulous paper and again recrystallized from water.

The acid thus obtained crystallizes in opaque white tetragonal prisms, melts at 140° C., and sublimes in the same prismatic form, the crystals generally radiating from a centre. It is very soluble in water and in ethyl ether, soluble in absolute alcohol and also in ordinary alcohol, sparingly soluble in chloroform, insoluble in benzol, toluol, and in petroleum ether.

When its solution in ethyl ether is evaporated at a temperature of about 60° C., a slight claret-red tint is produced, which soon resolves into spots of purple. This purple substance (somewhat resembling murexide) attaches itself to the crystalline mass, producing a very beautiful appearance. The crystals, including the purple substance, dissolve in water, with a disappearance of the purple coloration. In the spontaneous evaporation of the aqueous solution of the acid no change of color is noticed.

The acid does not contain sulphur or nitrogen.

The acid is absorbed by animal charcoal. When the urine itself is passed through animal charcoal the filtrate becomes dark claret-red in color, and has lost its reducing property.

Sodium hydrate gives a brownish coloration, beginning at the sur-

face of the liquid (due to absorption of oxygen). Oxyphenic acid gives an almost similar reaction, only that a green coloration is first produced, which is not the case with the other acid. The brownish coloration noticed when the diluted urine containing the acid is added to Fehling's solution, is partly due to the action of the alkali of the Fehling's solution upon the acid.

Pieric acid causes no change. Upon the addition of sodium hydrate to the mixture of the acid and pieric acid, a brownish coloration is produced, similar to that produced by sodium hydrate alone.

No reduction of the bismuth salt in Böttger's test occurs with the acid.

The acid responds to Trommer's test, as also to Fehling's test.

Argentie nitrate is reduced in the cold by the acid.

The fermentation test fails completely.

Its aqueous solution has no effect upon polarized light.

Upon the addition in turn of a dilute neutral solution of ferric chloride, ammonium hydrate, and acetic acid, the play of colors from green to violet, and then to green as with oxyphenic acid, does not occur. It does not respond to the tests for hydrochinon.

With a dilute neutral solution of ferric chloride a blue coloration is produced which very soon disappears. From this reaction the acid is most likely a phenol derivative. It forms lead, barium, and calcium salts.

The lead salt crystallizes in heavy needle-like prisms, melting at 209.5°C . It is soluble in hot water, insoluble in benzol, toluol, petroleum ether, absolute or ordinary alcohol, ethyl ether, and chloroform. It is decomposed when passed through animal charcoal, the acid remaining in the charcoal and the lead coming through with the filtrate as oxide.

On account of insufficiency of pure material—acid and lead salt—no ultimate analysis has thus far been made. In a short time I hope to have enough material for that purpose, and then a formula for the acid can be constructed, and more learned regarding its source in the human organism. However, two lead determinations in the lead salt have been made:

0.1466 gramme lead salt gave 0.0717 gramme PbSO_4 , equivalent to 33.50 per cent. of lead.

0.1314 gramme lead salt gave 0.0649 gramme PbSO_4 , equivalent to 33.66 per cent. of lead.

Mean percentage of the two determinations, 33.58 per cent. lead, indicating that the acid has a high molecular weight.

I would suggest for this substance, provisionally, the name glycosuric acid.

Medical Chemical Laboratory, University of Pennsylvania.

—*Med. News*, Jan. 8, 1887, p. 35.

KERNER'S QUININE TEST,

With special reference to the form in which it is applied in the French Codex.

By E. JUNGFLEISCH.

The recent discussions on the purity of quinine sulphate of commerce have induced me to lay before the Pharmaceutical Society of Paris sundry observations that I have already mentioned in a cursory manner in a report read to the Academy of Medicine. The point to which I shall refer especially is the test prescribed by the official pharmacopœia as a slightly modified application of the principle involved in Kerner's test. As it stands in the Codex of 1884 it certainly leaves much to be desired, but it does not merit all the censure that has been bestowed upon it. Though a delicate test, and in some respects even too delicate, it is nevertheless susceptible of being made use of by every pharmacist. It has, moreover, a characteristic which I would like to believe is ephemeral, but which may for the time be allowed to cover all its defects: among the tests which admit of the detection of the alkaloids most usually mixed with quinine sulphate it is still the least imperfect, the most simple, and the most expeditious.

Of all the criticisms which have been passed on this test the most telling is that relating to the preparation of the saturated solution of quinine sulphate at 15°C., charged also with the more soluble salts of alkaloids other than quinine.

The Codex directs that the quinine sulphate to be assayed shall be heated with water, but it does not specify the temperature. This criticism is well founded; it points out an omission that needs to be made good, and for that reason the Pharmaceutical Society of Paris has under consideration the provisional fixing, by a kind of convention, of a temperature at which the solution should be made. It may be useful to remark, however, that the decision to take this step would depend chiefly upon the demands to be made as to the purity of the official salt, but that, on the other hand, the fixing of that temperature would not give the process all the precision which some persons appear to hope. This is a point that deserves to be investigated.

In general I have operated at a temperature of 60° C., which corresponds sufficiently well to the too vague expression in the Codex ; but in principle I see no inconvenience in adopting any higher temperature, even that of boiling water, which has the advantage of being easily applied and kept constant. I even propose to show that the boiling temperature should be adopted, and also that the other conditions of the test should be rendered more stringent if it be desired to require the complete purity of the official quinine sulphate, while, on the contrary, if it be admissible to tolerate in that salt a small proportion of foreign alkaloids, the tolerance will be so much the less in proportion as the temperature is higher. The misconception of these conditions lies at the root of most of the discussions raised on the subject, and of the objections urged against the method of assaying in question.

If evidence of the purity of the salt is to be obtained, it is clear that in order to test it the whole of the foreign salts that are to be detected must be made to pass into solution. It is therefore necessary to dissolve as much as possible of the crystals, or, in other words, to raise the temperature as much as possible. It has been contended that if the solution is made with heat above the temperature of 35° C., even pure quinine sulphate will not answer the requirements of the Codex test, the reason being that the hot solution remains supersaturated after being cooled to 15° C. But it is easy to prove that the experiments upon which that statement has been based were made with very impure quinine sulphate. Moreover, the suggested explanation is no more admissible than the statement of the alleged fact, for a saline solution cooled, as in this case, in contact with a large quantity of crystals of the salt in solution, would not remain supersaturated.

When, in short, the Codex test is applied to really pure quinine sulphate by heating on a water-bath to 100° C. in making the solution, the liquid obtained will remain limpid after the addition of ammonia just as well as when the temperature has been raised only to a much lower degree. But that is not all, and when in that case, operating either with or without heat, the ammonia (0.96 specific gravity) is gradually added to the 5 cc. of the properly cooled solution, it will be found that in order to dissolve the precipitate at first formed it is not requisite to use the 7 cc. of the reagent ordered by the Codex, but that a much less quantity, about 5.5 cc., will be found sufficient for restoring the clearness of the liquid.

This very simple experiment furnishes a conclusive answer to the objection above mentioned, and it justifies my second proposition, that if the official salt is required to be completely pure the Codex test must be modified, not only by carrying the temperature to 100° C., but also by limiting to nearly about 5.5 cc. the volume of ammonia solution of 0.96 that is to be added for the purpose of rendering the liquid clear after precipitation.

It is sufficient to read the article in which the Codex treats of quinine sulphate to recognize that its editors have taken a different point of view. They have only demanded for this salt a relative purity. This is evident from the indications given for ascertaining "the presence of an inadmissible proportion of alkaloids other than quinine." But if the authors of the official pharmacopœia hesitated to insist upon the complete purification of an industrial product, in regard to which certain consumers had themselves acquired usages difficult to abandon suddenly, they nevertheless very clearly showed, by the nature and the number of the tests prescribed, their intention to induce French pharmacists to exercise increased vigilance in this particular. But however that may be, a test admitting of a certain degree of tolerance is the point of more special interest at the present moment.

The quinine sulphate of commerce retains foreign bases in two ways. First, the surfaces of the crystals are moistened with a certain quantity of mother-liquor which imperfect draining has not removed, and that has afterwards dried upon them. Second, the crystals formed in a liquor, charged with cinchonidine sulphate, for example, have entangled some of the latter salt, and sometimes a considerable proportion of it.* In treating quinine sulphate to be tested as Mr. Kerner directs in one of the forms of his test, with cold water, the water readily becomes charged with the soluble salts left by the mother-liquor on the surfaces of the crystals, but it does not come sufficiently into contact with the cinchonidine sulphate entangled among those crystals, and that is consequently protected from the action of the solvent by the sparingly soluble quinine sulphate amongst which it is in-

* The tendency of quinine sulphate and cinchonidine sulphate to crystallize together is very marked. When quinine sulphate mixed with a few hundredths of cinchonidine sulphate is dissolved in boiling water, and even when the volume of the solvent is many times more than would be sufficient in the cold to dissolve the whole of the cinchonidine salt if it were in a separate state, the latter salt will partially crystallize with the quinine sulphate during the cooling of the solution.

timately mixed up. When the mixture is heated gradually the proportion of quinine sulphate dissolved goes on increasing, and a larger quantity of the cinchonidine sulphate passes into solution in such a manner that, from the circumstance of the two salts being mixed in the crystals, the quantities dissolved of each are correlative. The volume of water used being insufficient for dissolving even at 100° C. the whole of the quinine sulphate, a very notable part of the impurities will also remain undissolved, and not come within the scope of the subsequent operations. By cooling the solution to 15° C. almost the whole of the quinine sulphate crystallizes out, taking with it some of the cinchonidine salt; but the greater part of this latter salt remains in solution. The quantity of cinchonidine salt transferred to the solution is thus increased in proportion as the heating is augmented. It can easily be ascertained that this is what happens, by making several tests with the same sample of impure quinine sulphate, and applying different temperatures for the solution. It will thus be found that the volume of ammonia necessary for redissolving the bases liberated will be increased in proportion as the temperature applied is higher. This may also be ascertained by comparing the weights of the dry residues left on evaporating equal volumes of the solutions obtained when different degrees of heat are applied in the testing operation. M. Marty has in this way shown that the quantity of the residue is greater in proportion as the heating is greater.

In short, the delicacy of the test is so much greater as the solution is made at a higher temperature, and the selection of a particular temperature should be regulated according to the greater or less demand for proof of purity in the official quinine sulphate.

It has also been said that this mode of testing, when carried out with heat, involves the demand for an exaggerated degree of purity incompatible with the industrial production of quinine sulphate. One of the experiments cited above is sufficient to prove the contrary. It will be remembered in fact that pure quinine sulphate, treated with warm or even boiling water, gives a solution, 5 cc. of which, when cooled to 15° C. became quite clear on addition of about 5.5 cc. of ammonia solution (0.96). But the Codex does not require this result to be produced by less than 7 cc. of ammonia solution; the difference of 1.5 cc., or more than one-fifth of the whole quantity, being available for the solution of bases other than quinine in the event of their being present. This difference represents therefore the tolerance of the prescribed test.

If it be attempted to appraise that tolerance by expressing the quantity of foreign bases that may be present in quinine sulphate which is shown by the test to be acceptable, the result will be a failure. Hitherto I have supposed, for greater simplicity of exposition, that the impurity is exclusively cinchonidine sulphate. This is at the present time most frequently the case, but, sometimes, other bases also occur in the commercial product, though less frequently. Those bases, being unequally soluble in ammonia, the delicacy of the test in reference to each of them will be inversely as their solubility, and the tolerance will be variable.

Nor is this all, for in considering only the admixture of cinchonidine, and admitting a fixed temperature, say 60° C. for instance, as being adopted in practice, that is to say, by reducing the problem to the most simple form, it is still impossible to arrive at a perfectly satisfactory conclusion. When 1 gram of quinine sulphate is treated with 10 cc. of water, the solution is only partial even at 100° C., and the interior parts of the crystals escape the action of the solvent entirely.

Under these conditions it will happen that for a given amount of cinchonidine in a sample of salt tested, if the impurity arises solely from imperfect drainage off of the mother-liquors and is superficial, the proportion of cinchonidine that will pass into the solution will be greater than if the impurity be due to cinchonidine actually in the crystals. Consequently the delicacy of the test would be greater in the former case than in the latter and the tolerance would be less in that case. Moreover, when it is noted that the crystals vary in size and present a varying surface, that they are not generally homogeneous, that the distribution of the cinchonidine through the interior of them necessarily alters according to the circumstances of the crystallization, etc., it is impossible to avoid recognizing that the tolerance to be appraised will have a considerable range of variation. Therefore, I cannot express by figures having any precision the increase of the tolerance corresponding with the application of the test at temperatures between 15° and 100° C. With cinchonidine sulphate as the sole impurity, and taking 60° C. as the temperature for making the solution, the quantity of foreign substance passing unnoticed appears to vary between 4 and 5 per cent. The magnitude of this amount may perhaps be an argument in favor of raising the temperature to be adopted; but this is a point which I merely mention here as deserv-

ing consideration. When the test is applied without heating, as the German Pharmacopœia directs, the tolerance may amount to 12 per cent., or even more than that.

The foregoing remarks must be understood as applying to the quinine sulphate of commerce. The figures obtained by various authorities with mixtures prepared for the purpose are not applicable to the mixed crystallization of the commercial salt.

There are certain other objections of secondary importance which appear to me as being well founded in reference to the method of testing used in question.

I have already pointed out that considerable precision is required in carrying out the details of the operation, and especially in the measurement of the volumes of the liquids used.

I may also add that the temperature of 15° C., at which the solution has to be kept for some time, is not always readily obtainable, especially in summer, without having recourse to some means of artificial refrigeration.

Another small difficulty arises from the physical condition of quinine sulphate, owing to which it mechanically retains the aqueous liquid with which it is mixed, and does not always allow the separation by means of a paper filter of the volume necessary for the treatment with ammonia. The result required may, however, be easily obtained by making use of a filtering apparatus formed of a funnel fitted with a plug of cotton wool, and fitted by a perforated cork into the neck of a tubular flask, so that the solution may be sucked out from the crystals.

Another point of more importance is the strength of the ammoniacal solution being precisely regulated to the requirements of the test. If, for instance, it were used of a specific gravity of 0.925, considerable errors would result, and the quinine sulphate represented as being acceptable for use under such conditions would in reality be very impure. It is therefore impossible to lay too much stress upon the importance of accuracy in the preparation of the ammonia solution.

The Codex has stated in a note the error that may be caused by the application of the test to an effloresced salt. A pure salt, whether effloresced or not, will never be mistaken for an impure one when the test is applied to it in accordance with the directions of the Pharmacopœia; it may even be remarked that if complete purity had been required in the official salt, the weighing of the quantity taken for

testing would have been superfluous, for the solution after recrystallization at 15° C. ought always to give a clear liquid on the addition of ammonia, however much of the salt was operated upon. But since a certain tolerance is allowed for the manufacture the case is altered in this respect. If the sulphate has lost by efflorescence some part of the water which it should contain in the normal condition, one gram of it will represent a proportionally larger quantity of the fully hydrated salt; the impurity passing into solution would thus be increased in quantity and the tolerance diminished. In such a case the best plan is to dry the salt completely at 100° C., and to take a quantity weighing $\cdot 8555$ gram instead of one gram, as the Codex recognizes that the salt should contain 14.45 per cent. water of crystallization. At the same time it should not be forgotten that in efflorescing, the crystals undergo a disintegration which renders the material especially fit to be acted upon by water as a solvent, and this will tend to diminish the tolerance.

Recently Kremel has pointed out a possible modification of Kerner's test, based upon the circumstance that the solutions of the sulphates of cinchona alkaloids saturated at a temperature of 15° C. contain different quantities of these salts as follows:—

5 cc. of solution.	Contain
Quinine Sulphate.....	0.0062 gram of the salt.
Quinidine "	0.0464 " "
Cinchonidine "	0.0510 " "
Cinchonine "	0.0925 " "

Consequently, the same measure of the solutions also contain very different quantities of sulphuric acid, and as the alkaloids in question do not react upon phenolphthalein it is possible to titrate the sulphuric acid in a solution of quinine sulphate, with an alkaline solution as well as if it was in a free state. The quantity of sulphuric acid found in a solution of pure quinine sulphate would be very much less than in a solution of an impure sample, and in this way the amount of impurity might be ascertained.

The sources of errors already referred to as being inseparable from the preparation of the solution saturated at 15° C. from the commercial quinine sulphate would obviously exercise the same kind of influence upon results obtained by the method proposed by Kremel as upon those obtained by the method of the Codex. A further error would also be made by taking the quantity of sulphuric acid as being

in constant proportion to that of the anhydrous sulphates, even when the bases of those salts were not isomeric, the molecular weight of cinchonidine sulphate being 718 and that of quinidine sulphate 746. Another error would result from the identification, from the point of view of foreign material, of cinchonine sulphate with two molecules of water of crystallization (molecular weight 754), with cinchonidine sulphate containing six molecules of water (molecular weight 794).

Some time ago Dr. Hesse pointed out a method of testing, which differed in principle from that of Kerner as applied in the cold only, in using another solvent for the alkaloids, ether being substituted for ammonia for this purpose. This mode of testing has been slightly modified by Schaefer and recommended by him in the following form:—A gram of the quinine sulphate to be tested is heated with 20 cc. of distilled water to the boiling point, and, after being allowed to cool, 5 cc. of the clear filtered liquid is placed in a well-corked tube with 1 cc. of ether and five drops of ammonia and then well shaken. If after the lapse of twenty-four hours there is no separation of crystals from the ether solution of the alkaloid, the quinine sulphate is considered to be acceptable for use as pure. But even with this modification, the test in question, although possessing some delicacy for detecting cinchonidine, has not this advantage in regard to quinidine, which is somewhat freely soluble in ether. It must not, therefore, be forgotten that although cinchonidine is at the present time the most ordinary impurity of quinine sulphate, the salt prepared from euprea bark does not contain any cinchonidine, but a very considerable proportion of quinidine.

The testing of quinine sulphate by means of the polarimeter having many partisans, I venture to state here the reasons for which I consider that this method of testing is a bad one. I shall show that it is very much wanting in delicacy, and besides this, that it may give rise to very considerable errors.

There is no doubt that quinine sulphate possesses a specific rotatory power peculiar to it, which is susceptible of being applied for ascertaining the purity of the salt. This rotatory power being the highest among those of the levogyrate sulphates of the cinchona alkaloids, being, in fact, a maximum quantity, its application for the purpose presents an especial advantage. If, therefore, the quinine sulphate employed in pharmacy were to be perfectly pure, that method of testing, with more or less delicacy, would be applicable for the purpose in view.

But when it is requisite to allow manufacturers a certain tolerance, and in consequence of this to ascertain whether the salt to be tested is contaminated with foreign substances in proportion above or below a fixed limit, the case is no longer one of the same nature. Some very simple calculations will suffice to show this, and I shall for this purpose make use only of the figures furnished by M. Oudemans, and take for illustration the experiments made under the conditions of dilution for which those figures have been found.

In calculating for a length of column of 2 decimetres the deviation produced by 0.436 gram of the alkaloid sulphate dissolved in 20 cc. of absolute alcohol the following results are obtained. The deviation is $a_D = -6.86^\circ$ * for the neutral crystallized quinine sulphate, and for the neutral crystallized cinchonidine sulphate it is $a_D = -5.17^\circ$ †.

Therefore the deviation produced by any mixture of these two sulphates will lie between these two extreme limits. One hundredth part of the difference between the two figures (1.69°) would be 0.0169, and that would be the influence exercised by the presence of 1 per cent. of cinchonidine sulphate, more or less in quinine sulphate. I believe that this relation between 17 thousandths of a degree and each hundredth part of cinchonidine sulphate more or less in the mixture will render sufficiently appreciable the delicacy of this method of testing. But the method has still another defect of very much greater significance.

If pure quinine sulphate be mixed with one hundredth part of quinidine sulphate, a highly dextrogyrate salt, the deviation calculated for the same conditions would be for $a_D = -6.701^\circ$ ‡, and that is precisely

$$* \quad a_D = \frac{a_{Dl} p}{v} = \frac{157.4 \times 2 \times 0.436}{20} = -6.86^\circ.$$

$$\dagger \quad a_D = \frac{a_{Dl} p}{v} = \frac{118.7 \times 2 \times 0.436}{20} = -5.17^\circ.$$

$$\ddagger \quad a_D = \frac{a_{Dl} l}{v} = \frac{0.99 \times 0.436}{v} + \frac{a_{Dl} l}{v} = \frac{0.01 \times 0.436}{v}$$

$$* \quad a_D = \frac{0.4316 \times 2 \times 1.574}{20} + \frac{0.0044 \times 2 \times 211.5}{20}$$

$$a_D = -6.793 \times 0.092 = -6.701^\circ.$$

the result which would be obtained with a mixture of 90.83 quinine sulphate with 9.17 of cinchonidine sulphate.* In this manner, quinine sulphate containing an admixture of 10.5 per cent. quinidine sulphate would produce a deviation of 5.17, that is to say a deviation precisely equal to that produced by pure cinchonidine sulphate.†

I have here supposed that an alcoholic solution is operated upon, because the memoir of M. Oudemans furnishes directly the data necessary for the calculation of this particular case; but in principle there is no difference when the salt is dissolved in water by the aid of sulphuric acid. The delicacy is, however, a little greater, and the error a little less in the latter case, the relations between the specific rotatory powers of the three acid salts being a little less unfavorable than those obtaining between the neutral salts. Now, for example, when a deviation of -12.13 is observed for pure quinine sulphate, the presence of two per cent. quinidine sulphate in the quinine salt would suffice to reduce the deviation to -11.60, while to produce the same result it would be necessary that the quantity of cinchonidine sulphate mixed with the quinine salt should amount to 11.8 per cent.

Thus then with the alcoholic solution quinine sulphate containing only ten hundredths of impurity might be mistaken for pure cinchonidine sulphate, and with the acidulated aqueous solution the possible error would vary from one to six times as much. This consideration of the case will make it unnecessary to refer to other sources of error.

Before concluding I will add another remark.

It is by design that I have made use of the term tolerance in treating of this subject. If it could be maintained that the presence of a few hundredths of the alkaloids allied to quinine would be incapable of causing any real prejudice to patients, if certain manufacturers pretend that the elimination of these last traces of impurity presents difficulties for them, if various reasons induce us to allow for the present a certain latitude to the manufacturer, it is nevertheless incontestable that there is here only a question of tolerance to be dealt with; the pure quinine sulphate is the official article, the normal article, the imperfectly purified salt being nothing more than a make-shift.‡ The conversion of

$$* \quad 6.701 = \frac{(6.436 - x)2 \times 157.4}{20} + \frac{x \times 2 \times 118.7}{20} \quad \text{whence the weight of cinchonidine salt } x = 0.04 \text{ or } 9.17 \text{ per cent. of the mixture.}$$

† $(100 - x)157.4 + 211.5x = 118.57 \times 100$; whence $x = 10.5$.

‡ "The official quinine sulphate should not contain any of the other cinchona alkaloids."—Codex, 1884, p. 299.

the impure salt into a pure salt represents nothing more than a small difference in the intrinsic value; the pharmacist really solicitous for the quality of the products he supplies will therefore act wisely in repudiating any kind of tolerance, and demanding from the manufacturer to be supplied with an absolutely pure salt. This is easily to be characterized according to what has already been stated above; § its special crystallization in a dense form is moreover a primary feature which has maintained up to the present its value, and to which pharmacists should adhere.

I am well aware that it is usual to attach to the light sulphate particular qualities, the value of which I do not remember. Certain makers have even found themselves constrained lately to give the pure salt this light form, and they have succeeded in doing so. The commercial interest attaching to their success in this respect ought to be a real one, since they congratulate themselves upon it; but I do not perceive any advantage that pharmacists would derive from the circumstance that an article which they sell in a state of purity should receive the appearance of the same article in an impure condition.—*Phar. Jour. and Trans.*, Jan. 22, 1887; *Jour. Phar. Chim.*, Jan. 1887. p. 5.

ON POIVRETTE

By PROF. J. CAMPBELL BROWN, D. Sc.

Read at the Meeting of Public Analysts, January 12th, 1887.

The substance known in the pepper trade as “Poivrette,” or “Pepperette,” is now so frequently used for the purpose of “fraudulently increasing the weight and bulk” of commercial pepper, that the members of this Society ought never to omit a careful search for it in all samples of pepper officially submitted to them. As many commercial analysts do not appear to be yet familiar with poivrette, and as some public analysts have applied to me for specimens, a short account of it may be of use to the Society. It made its first appearance in Liverpool last summer, when more than one wholesale pepper merchant brought me samples, and inquired what the substance was, and what were its properties. During the last three months I have met with it in between twenty and thirty retail samples of pepper.

½ Kerner's test modified applied at 100° C.; 5 cc. of the solution at 15° C. being rendered clear by less than 6 cc. of ammonia (0.96 specific gravity), the other characters named in the Codex; maximum rotatory power to the left, etc.

Poivrette is a pale, slightly buff, or cream-colored powder, resembling in the bulk the principal middle layers of the pepper-berry, when ground; and when mixed with pepper cannot be distinguished by the eye, nor even by the hand-lens, from particles of pepper. In the earlier samples the coarser particles could be isolated by spreading the pepper on a stiff sheet of paper held in a nearly, but not quite horizontal position; on tapping this with the finger tips, so as to make the larger particles jump gradually to the lower edge of the sheet, the poivrette particles could then be picked out, and easily distinguished from pepper by crushing them between the teeth. Recently, however, it has been so finely ground and sifted that it cannot always be partly separated in this way, although the toughness and hardness of the particles can always be distinguished by the teeth in a mixture.

Microscopic examination, with a $\frac{1}{6}$ th or $\frac{1}{8}$ th objective, shows that it consists of pale, dense ligneous cells, some entire and marked with linear air spaces, some torn and indistinct.

The following letters (which afterwards appeared in some local newspapers) indicate the country from which it comes:—

The following letter from Leghorn has been received by a local spice house, and similar letters have been circulated throughout the country:—

“LIVORNO, August 1, 1886.

Dear Sirs,—I send you by this post two samples of an article called ‘pepperette’ (white and black), which is made of the pulp of a fruit growing in this country, which has the power of retaining the piquancy of pepper when it has been mixed with the same in the proper proportion. This is warranted to consist of this purely vegetable substance, and to contain nothing deleterious, consequently to be in no way detrimental to the health. The price is £8 per ton of 1000 kilogrammes, goods delivered c.i.f. in Liverpool, packed in 2 cwt. bags; bags free, no tare, shipping weight; $2\frac{1}{2}$ per cent. discount for cash. I export my pepperette very largely all over the Continent and to Great Britain, where, on account of its cheapness, it is used very much for blending pepper, which is sold as “prepared pepper,” or “pepper not warranted genuine,” in the same way as is done with mustard, or with ground coffee and chicory (the so-called French coffee). If so desired, the white pepperette can be had much lighter. If you desire any references I shall be happy to furnish you any amount in England, as well as on the Continent.

Yours Truly

————— .”

A reply was forwarded, in due course, to the manufacturers of "pepperette," asking for further particulars and references, and the following letter was received:—

"Dear Sirs,—I am favored with your letter, 16th instant, and note contents, 'Pepperette.' What you ask me is a question that is very frequently asked me by English houses, but I am always in the impossibility to reply to it; in fact, I *must not* do it. When I sell my 'pepperette' (or 'poivrette') to a firm, I bind myself not to mention their name to anybody, and will do so with your good selves, if I have the pleasure of being favored with your orders. I make it a point of the question of secrecy with all my customers for this article, and cannot make an exception with you. Give me a sample order of a few tons, and I shall execute it to your entire satisfaction; payment after receipt and approval of the goods. However, for your guidance, and according to what I promised with my letter of the 13th inst., I now beg to subjoin a few English references, who can inform you concerning my respectability, but kindly do not mention to them anything about 'poivrette,' the same being houses from whom I import English goods (*i. e.*, my firm, ———). As already written, I shall be able to send sample of white poivrette of lighter color by October next. In the meantime I trust to be favored with your esteemed orders, and remain, dear sir,

"

I therefore examined, amongst other substances, walnut-shells, almond-shells and olive-stones. The cells of walnut-shells are dotted, though otherwise similar to poivrette; the almond-shells greatly resemble poivrette, and olive-stones still more closely resemble it. Chemical analysis indicates the closest correspondence between poivrette and olive-stones, as the following figures show:—

	Ash.	Mattersol- uble by boiling in dil. acid.	Albuminous and other mattersolu- ble in alkali.	Woody fi- ber, insolu- ble in acid and alkali.	Starch.
White pepperette.....	1.33	38.32	14.08	48.48	None.
Black pepperette	2.47	34.55	17.66	47.69	"
Ground almond-shells.....	2.05	23.53	24.79	51.68	"
Ground olive-stones.....	1.61	39.08	15.04	45.38	"

The stones of olives, imported in pick'le for table use, gave 3.68 per cent. of ash, but well washed olive-stones, thoroughly burnt to a white ash, gave under two per cent. of ash like poivrette. "White poivrette" is therefore cleaned very pale, and perhaps partly bleached

olive-stones, or precisely similar tissue; black poivrette is the same, mixed with a little black husk. It is to be noted that, although it contains no starch, yet it yields some sugar to Fehling's solution, after being boiled for some time with dilute hydrochloric acid. The quantity depends on the length of time and strength of acid, but may be stated approximately about ten per cent. It is important to bear this fact in mind when making a full chemical analysis of pepper containing poivrette. After removing from such a mixture the matters soluble by boiling in dilute caustic alkali, the woody fiber which remains had a yellow color; it consists of the poivrette, and some of the cells of pepper-husk and one of the subcortical layers of the pepper-berry. The pepper-cells are made lighter, and the poivrette cells darker by the alkali, so that the two are more nearly of a similar yellow color after treatment with alkali. This renders it more difficult to distinguish such of the cells as have somewhat similar markings; but it enables us to distinguish more clearly, as poivrette, the many torn particles which have no definite form or markings. The final examination of the complete cells is better made with good daylight rather than with artificial light, and in a portion which has been treated with water only.

The pepper cells are mostly different in shape, and are colored, and have generally a dark substance in the interior. They are not numerous, but the quantity varies in commercial samples, owing to the modern practice of decorticating the pepper-berry to every different extent possible, and mixing the various portions so obtained, including husks, in every variety of proportion with each other or with ordinary pepper. Each individual analyst must make himself familiar with both kinds of cells, as no description can convey an adequate idea of either. In order to form a judgment regarding the proportions of the different chemical constituents of commercial samples, we require to know the chemical composition of the different layers of the pepper-corn; and I hope soon to communicate to the Society some figures bearing on this point, as well as to notice some other substances used in the sophistication of pepper.

It is interesting to note that the exemption, mentioned in section 8 of the Sale of Food and Drugs Act, in the case of a label being affixed to the article sold, intimating that the same is a mixture, does not apply in the case of poivrette, the admixture being made manifestly for the purpose of fraudulently increasing the weight and bulk.

Liverpool, 4th January, 1887.—*The Analyst*, Feb., 1887, p. 23.

FERMENTS IN MILK JUICES.

BY A. HANSEN.

The author has examined the latex of different species of plants for the presence of ferments. He finds none in the Euphorbiaceæ, in *Ficus elastica*, *Scorzonera*, *Taraxacum*, or the juice of the opium poppy. The latex of *Ficus Caricæ* on the other hand, contains principles capable of effecting four fermentative changes; they peptonize albuminoïds in the presence of either alkalis or acids, act like diastase on starch, and coagulate the casein of milk. 20—100 grams of fibrin previously caused to swell by immersion in hydrochloric acid of 0.2 per cent. strength, are completely dissolved in 10—30 minutes when treated at 40° with 2—3 cc. of this latex. The products of this digestion are the same as with pepsin, yet the two ferments are not identical, since the ficus latex peptonizes in presence of alkalis as well as acids, although more slowly. Probably there are two peptic ferments present, one acting in acid, the other in alkaline solutions.

By digestion with hydrochloric acid, the latex entirely loses its peptonizing properties; digested with sodium carbonate (which destroys the activity of pepsin) it retains them intact. If a few drops of the latex be added to milk, which is then raised to the boiling temperature, the casein is at once precipitated. Incipient ebullition therefore, does not destroy the curdling power of this latex, although prolonged ebullition does, and even a temperature of 65° if continued for two hours. The diastatic action of this latex is demonstrated by the partial transformation of starch-paste and glycogen into sugar. When the latex is precipitated by alcohol and the precipitate taken up with water, the action on milk and on starch is found to persist, whilst that on fibrin disappears.

The latex of *Carica Papaya* peptonizes, precipitates casein, and transforms starch into sugar.

The author does not consider that these vegetable ferments play any rôle in the nutrition of the plant.—*Jour. Chem. Soc.*, 1886, p. 1059; *Botan. Ztg.*, 1886, p. 137.

CONVERSION OF GLUCOSES INTO DEXTRINS.

BY E. GRIMAUX AND L. LEFEVRE.

Pure glucose was dissolved in eight times its weight of hydrochloric acid of sp. gr. 1.026, the solution distilled in a vacuum on the water-bath, and the syrupy amber-colored residue dissolved in water and

precipitated by alcohol, solution and precipitation being repeated several times. The product was then dissolved in water, decolorized by animal charcoal, the solution concentrated by evaporation in a vacuum on the water-bath, and then allowed to evaporate in a vacuum at the ordinary temperature. The product thus obtained is a white powder which resembles ordinary white dextrin, is very hygroscopic, and forms gummy solutions. Its reducing and rotatory powers vary with the number of times the substance has been redissolved and reprecipitated. When prepared by the method just described, the dextrin contains a small proportion of fermentable sugar, which can be removed by treatment with yeast. After purification in this way, one product had a reducing power of 17·8 per cent., whilst its rotatory power for $[\alpha]_D = + 97\cdot48$.

The dextrin obtained in this way has the composition $3C_6H_{10}O_5 + H_2O$, and belongs to the class of aehroodextrins. Its general properties resemble those of the dextrin obtained by Musculus by the action of sulphuric acid on glucose in presence of alcohol, but it has a lower rotatory and reducing power. It is not colored by iodine, is unaffected by infusion of malt, and undergoes hydration somewhat slowly when boiled with dilute acids. The glucose formed from it by the action of acids is readily fermentable.

The alcoholic liquid from which the dextrin has been precipitated contains other dextrins with higher reducing powers, together with a fermentable sugar which is found by Fischer's reaction with phenylhydrazine and sodium acetate to be a mixture of glucose and maltose.

Galactose from milk-sugar behaves like dextrose, and yields a galactodextrin which resembles glucodextrin. Its reducing power in terms of glucose is 10 per cent., and its rotatory power for $[\alpha]_D = + 80$.—*Jour. Chem. Soc.*, 1886, p. 1003, *Compt. rend.* ciii, 746.

GLEANINGS IN MATERIA MEDICA.

BY THE EDITOR.

Cantharides as a preventive of hydrophobia.—According to *Brit. Med. Jour.*, a Russian physician, Dr. Karchewski, has treated three persons, who had been bitten by a rabid wolf, with cantharides plaster applied to the wounds, giving at the same time one grain of powdered cantharides daily for one week. After seven months no symptoms of rabies had appeared.

This method of treatment was recommended as being always successful by Dr. J. N. Rust, of Berlin, in the early part of this century; for internal use he ordered:

Cantharid.....	gr. xij.
Lapid. cancor.....	
Sacchari.....	āā ʒjss.
M. ft. pulv. xij	

One powder to be taken twice or thrice daily.

In this connection it may be mentioned that according to *Les Nouveaux Remèdes*, 1886, p. 525, Dr. Keegan has treated in India, with apparent success, several cases of hydrophobia by the local application of a four per cent. solution of *cocaine* to the back part of the throat; and that Dr. Fernandez, of Barcelona (*Ibid.*, p. 521), is experimenting upon dogs by inoculating them with *viper poison* as a preventive of rabies.

Aesculus Hippocastanum, Lin.—In medical works, including those on medical botany, in which the horse chestnut tree is mentioned, the discussion of the medical properties is usually confined to the use of the bark as an antiperiodic, and of the fixed oil as a topical remedy in rheumatic complaints. Occasionally the sternutatory properties of the powdered seeds are mentioned, and in works from the beginning of the present century we find it stated that a paste made from the seeds is useful in chilblains, and a decoction of the roasted seeds has been recommended in atonic uterine hemorrhages. A still older work (Murray appar. IV. p. 62), which is stated to give the uses of the horse chestnut in former times, could not be consulted by us. In only one of the modern works consulted (National Dispensatory, 3rd and 4th edit., p. 765) has been observed a reference to the popular use of the leaves in whooping cough, and of the seeds in hemorrhoids.

That this popular use has not been forgotten, we learned from Mr. Geo. W. Stoeckel, of Reading, Pa., at the meeting of the Pennsylvania Pharmaceutical Association in 1886. More recently Mr. Stoeckel has informed us that the use of the leaves and seeds in the manner indicated below is not uncommon in the southeastern counties of Pennsylvania. A decoction of the leaves is regarded as a remedy in whooping cough and is given in small doses frequently repeated, while the bruised fresh leaves, sometimes mixed with lard, are at the same time employed externally. The entire seed is carried in the pocket

as a kind of charm against piles, and the powdered white kernel is thoroughly triturated with lard into an ointment, which is said to be successfully applied against piles.

Poisoning by the bark of Robinia Pseudacacia, L.—Dr. Z. T. Emery reports (*N. Y. Med. Jour.*, Jan. 22, 1887) on the poisoning of thirty-two boys at the Brooklyn Orphan Asylum from chewing the inner bark of the locust-tree, which they had obtained from the yard where fence-posts had been stripped. In the mildest cases vomiting of ropy mucus was observed, together with flushed face, dryness of throat and dilated pupils. In the severest cases large quantities of ropy mucus mixed with blood were vomited; the other symptoms were retching, pain in the epigastrium, debility, stupor, extremities cold and pulseless, heart's action feeble and intermittent, pupils dilated, faces of a dusky pallor. These patients were given bismuth subcarbonate and brandy by the mouth, and morphine hypodermically; sinapisms were applied over the stomach and bottles with hot water along the extremities. The patients were discharged from the hospital in two days.

The stem bark has never been examined chemically. Asparagin has been found in the root, and the flowers contain the glucoside robinin, which yields quercetin. The bark deserves investigation in view of the fact that a number of woody leguminous plants are known to contain poisonous alkaloids and other more or less active principles.

Cinchonidine in Quinine sulphate.—Dr. Louis Schæfer, of Mannheim, recommends the following test, which depends upon the very sparing solubility of quinine oxalate in water containing a slight excess of potassium oxalate, and upon the comparatively ready solubility of cinchonidine sulphate in the same liquid: Dissolve 2 gm. crystallized quinine sulphate in a tared flask in 55 ccm. of boiling distilled water; add 0.5 gm. neutral potassium oxalate previously dissolved in 5 ccm. of water; maintain the weight of the contents of the flask at 62.5 gm.; cool for half an hour by placing the flask in water of 20°C. and filter. On adding to the filtrate one drop of caustic soda solution (sp. gr. 1.160), a turbidity or a precipitate of cinchonidine will take place, in case one per cent. or more of cinchonidine sulphate was present in the quinine salt; with smaller quantities of the impurity the filtrate will remain clear.

The same process may also be used for the quantitative determination of cinchonidine, but it is better to work with the following quantities: quinine sulphate 5 gm., distilled water 145 gm., potassium oxalate 1.25 gm. and distilled water 5 gm. The cold liquid is filtered, 100 ccm. of the filtrate mixed with 10 drops soda solution (sp. gr. 1.160), the mixture warmed moderately, then set aside for twelve hours, the precipitate collected on a filter, washed with little water, dried and weighed. To this is added 0.040 gm. (cinchonidine soluble in 100 ccm. of liquid), and by multiplying this sum with 1.750 ($=\frac{3}{2} \times 1.167$) the weight of cinchonidine sulphate contained in 5 gm. of quinine salt is obtained. The results are approximately correct provided the cinchonidine sulphate (anhydrous) does not exceed 10 per cent., in which case the results are decidedly too low.—*Archiv d. Phar.*, Jan., 1887, p. 68.

The diuretic effects of caffeine, which have been previously observed by Zwenger, Gubler, Shapter and others, have recently again been the subject of investigation. The result of von Schroeder's experiments (*Arch. f. Path. u. Pharmak.*, Oct., 1886) point to two opposite effects of caffeine, 1, in stimulating the nervous system, similar to strychnine, and tending to decrease the flow of urine through the contraction of the renal vessels; and 2, in stimulating the kidney itself and thus greatly increasing the amount of urine. That the diuretic action varies considerably in intensity, was observed by Bronne (*Dissertation*, Strassburg, 1886). He administered the alkaloid in divided doses every two hours, 0.5 to 1.5 gm. being the total amount given in the morning only, so as to prevent it from causing sleeplessness; and if its employment must be prolonged, he advises its occasional discontinuance for a few days, when the remedy will act as promptly as before.

Eupatorium Ayapana, Ventenat, is at present met with in European commerce (*Phar. Zts. Russl.*, 1886, p. 707). The drug consists of dried leaves, about 8 cm. long and 15 mm. ($\frac{3}{8}$ inch) broad, brown, smooth, oblong-lanceolate, the margin somewhat revolute. Two prominent lateral veins branch off from the midrib near the base, and extend parallel with the margin to the apex. The odor is slight coumarin-like, and the taste mildly astringent and aromatic. The leaves are recommended against indigestion, pectoral complaints and in cholera, and were used for similar purposes in Europe in the early part of the present century.

The shrub is indigenous to Brazil, but is now found throughout

tropical America and in India. L'Heritier and Martius reported also its efficient use in Brazil against snake bites, the leaves being employed externally and internally.

Eupatorium villosum, Swartz, is indigenous to Jamaica and the Bahamas where it is largely used as a tonic, also as a substitute for hops in beer. *Eup. amarissimum* is mentioned as being employed in a similar way; the Mexican Pharmacopœia mentions *Eup. collinum*, *De C.* (See AM. JOUR. PHAR., 1886, p. 169.)

Adulterations of saffron with foreign floral organs or with meat fibres have never been observed by Dr. Niederstadt (*Arch. Phar.*, Jan., 1887, p. 73). A sample of the finest quality of French saffron contained 14 per cent. of moisture and 5.84 per cent. of ash, of which 1.546 per cent. (= 0.058 per cent. of the saffron) was sodium chloride. Four samples of Spanish saffron obtained from Barcelona as pure, contained

Moisture	16.70	15.80	19.80	17.60	per cent.
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Ash	10.30	(incl. 1.546 NaCl)	14.65	13.80	14.90	"
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Glycerin, which has also been used for increasing the weight, renders the saffron sticky and adhesive to blotting paper. An adulteration with honey is difficult to prove, since saffron contains about 15.30 per cent. of sugar, Dr. Niederstadt having found 13 per cent. On agitating adulterated saffron repeatedly with water, fine needle-shaped fragments of red saunders are separated and may be readily identified from the structure under the microscope. Inferior saffron will give with strong sulphuric acid only a slight blue color, in proportion to the amount of pure saffron present. (For a paper on Spanish saffron see AM. JOUR. PHAR., 1885, p. 487.)

Cazenave and Linossier (*Jour. Phar. Chim.*, 1886,) direct attention to the fraudulent sale of exhausted saffron dyed with various artificial coloring matters, some of which are difficult to detect, while others yield with water a red or orange red infusion, which after acidulation with tartaric acid, is a red dye for wool.

Starch and iodine.—Dafert states (*Phar. Zts. Russl.*, 1886, p. 660; *Landw. Jahrb.*, 1885,) that certain starches are not colored blue by iodine. The starch in the millet grains of *Panicum miliaceum*, *Lin.* var. *candidum glutinosum*, in contact with iodine solution, is colored yellowish-brown, red-brown or brown, the color disappearing on heating and reappearing on cooling. The cold prepared extract does not give a color reaction with iodine; hence dextrin-like compounds are absent. The reaction with iodine is the only means for distinguishing the above variety of millet from the variety *candidum*.

VARIETIES.

SUBNITRATE OF BISMUTH AS A DRESSING.—(1) Subnitrate of bismuth possesses antiseptic properties at least equal to those of iodoform. (2) No poisonous effects are to be apprehended, as in the employment of iodoform. (3) The subnitrate of bismuth, being a chemically indifferent substance, does not irritate the wounds; secretion is diminished. (4) Its action is very prolonged, although not vigorous, so that the dressings do not need to be frequently changed, and rest is insured for the wounds. (5) There is no action at a distance, nor does any specific effect attach to it. (6) It does not afford protection against erysipelas and other wound diseases, at least no more than iodoform. (7) It is no disinfectant, but as an antiseptic it keeps the wounds pure. (8) All wounds capable of healing by first intention can do so when dressed with bismuth. (9) It also represents an excellent material for forming scabs under which epidermis can grow over the wound. Its use on granulating wounds has not, however, been sufficiently studied as yet.—*Annals of Surgery*. See also *AMER. JOUR. PHAR.*, 1884, p. 598.

BORO-PHENOL.—This new disinfectant is a combination of borax and carbolic acid, and is intended for antiseptic and disinfecting purposes. The first thing we notice about it is that it has an odor which is really agreeable. This in itself is an immense advance on the old fashioned carbolic acid preparations. We find, too, that it is completely soluble in water, and that it forms a solution which may be used for all the purposes for which the ordinary carbolic acid disinfectants are applicable. The new combination has, however, to be used in very much smaller quantities than the carbolic acid disinfecting powder.—*Quart. Therap. Rev.*, 1887, p. 3.

ANTISEPTIC POWDER.—Lucas-Championnière recommends an intimate mixture of equal parts of finely powdered and sifted iodoform, quinine, benzoin, and carbonate of magnesium saturated with oil of eucalyptus. This powder may be applied directly to a wound or over a protective covering, and should be covered with cotton wool, and over this again macintosh should be kept in position by a bandage. After large operations the dressing should be renewed every third day; after small ones it may remain on eight days.—*L'Union Médicale*, December 11, 1886.

CONCENTRIC COMPOSITE PILLS.—J. Mortimer Granville suggests a method of compounding pills, which, he thinks, possesses important advantages. If one desires, for example, to administer one drug which shall be dissolved in the stomach with one which shall be dissolved in the intestine, the core of the pill, which is to be last acted upon, is first made and coated with keratin, which is not acted upon by the acid gastric juice, but dissolves readily in the alkaline fluids of the intestine. The pillule is covered then with the desired quantity of the drug which is to act on the stomach, and is again coated with gelatin or sugar, like ordinary pills.—*Brit. Med. Jour.*, Oct. 9, 1886.

PIPERINE has been successfully used in several cases of intermittent fever, which were not cured by quinine. It was given in doses of three to five grains, repeated every hour or every two hours.—*Brit. Med. Jour.*

TANNIN.—MM. Raymond and Arthaud have made some comparative researches on the action of sulphide of carbon, iodoform, and tannic acid in tuberculous patients. Having found that when tannin had been administered

to animals for a month, they were more refractory to the effects of the tubercular virus, it was used in more than fifty cases of tuberculosis in doses of from two to four grammes daily. In less than a fortnight half of the patients showed an increased weight, which continued during the treatment. In acute tuberculosis, both of the child and the adult, the symptoms amended, and the disease retrograded in some cases which had been looked on as hopeless.—*Quart. Therap. Rev.*, 1887, p. 9.

SULPHATE OF SPARTEINE.—Voigt, in the *Wien. med. Blät.*, 1886, Nos. 25 and 27 recounts the experience of the use of this drug in Professor Nothnagel's Klinik and confirms most of the views of Sée (*Am. Jour. of Phar.* 1886, p. 103), Laborde and Legris. It stimulates and regulates the heart, the pulse becomes stronger, and arterial tension is increased. It may be used in valvular disease where there is disturbed compensation, or to quiet irregular action even where the compensation is fairly good. It may likewise be given where, apart from valvular disease, the heart muscle is weak. Laborde and Legris advised $\frac{3}{4}$ to $3\frac{3}{4}$ grains in 24 hours. Voigt recommends doses of $\frac{1}{80}$ to $\frac{1}{30}$ of a grain only. He has known vertigo, headache, palpitation, and nausea follow $\frac{1}{80}$ to $\frac{1}{15}$ of a grain, but these symptoms are only transient, and do not prevent the continuance of the drug. Sometimes a slight narcotic action is observed. Sparteine acts quickly. The effect of one dose may last twenty-four hours. It is well to intermit its administration every few days. The influence, though quickly exerted, is not prolonged enough, Voigt thinks, to remove grave disturbances of the compensation. Repeated doses do not regulate the heart continuously like digitalis, but it is superior to caffeine, adonis vernalis, and convallamarin. It may be given in combination with digitalis.—*Med. Chron.* January, 1887.

THE PHYSIOLOGICAL ACTION OF VANILLIN.—Grasset (*Arch. de pharm.*, Aug., 1886;) has found vanillin fatal to frogs in doses of from three-quarters to nine-tenths of a grain, but has not ascertained that there is a toxic dose for the higher animals. In frogs, it acts chiefly on the spinal cord, its action being that of strychnine, but much milder. It seems to delay putrefactive fermentation. It is antagonized by chloral. Therapeutically, it may be used in doses of three quarters of a grain, as an aid to digestion, especially in atonic and putrefactive dyspepsia, or as a corrigent of drugs which, like chloral, are not well borne by the stomach; also, in doses of from three to four grains, in mucilage, as an excito-motor.—*N. Y. Med. Jour.*, January 29, 1887.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, February 22d, 1887.

The fifth of the present series of Pharmaceutical meetings was held this day; Mr. Wm. B. Webb being called to preside.

The minutes of the last meeting were read, and there being no corrections to be made they stand approved.

The actuary presented to the library from Messrs. Carpenter, Henszey & Co., a copy of the Medicine Chest Dispensatory published by Mr. G. W. Carpenter in 1836; from the Publishing Committee, the 4th edition of the Microscopist, by Dr. J. H. Wythe; from the British Pharmaceutical Conference

the Year Book of Pharmacy for 1886, and the Calendar of the Pharmaceutical Society of Great Britain for 1887. This last work contains a historic sketch of the society, its charter, the pharmacy act, supplements thereto, by-laws, the members and officers of the council, committees, boards of examiners, lists of officers from its formation, professors of the society, list of members, associates, registered apprentices, regulations of the board of examiners, the privileges of the society, the prizes, scholarship, lists of the prizemen and an account of the benevolent fund.

Mr. C. S. Bondurant, of St. Louis, Mo., a member of the senior class, read a paper upon *Hydrangea arborescens*, which was referred to the committee of publication. Several of the principles obtained in the investigation were exhibited and a test illustration was made, showing the peculiar fluorescence produced by an alkali (ammonia).

Mr. E. S. Beshore, of Pottstown, Pa., also a member of the senior class, read a paper upon *Chimaphila umbellata*. This also was referred to the publication committee. The results of the reactions described in this paper were exhibited to the meeting.

Mr. F. X. Moerk read a paper upon *subiodide of bismuth*, in which he detailed a variety of processes and exhibited the results of them.

Mr. Rosengarten stated that the experiments of Mr. Moerk confirmed his own in regard to the impossibility of obtaining the pure subiodide by the processes recently published: he was glad to have had the opportunity of hearing the paper. The paper was referred to the committee on publication.

Prof. Maisch called attention to the *kombé poison*, from Africa, the product of a species of *Strophanthus*, noticed in AMERICAN JOURNAL OF PHARMACY, 1886, p. 405, and exhibited specimens obtained from Messrs. Burroughs, Wellcome & Co., of London, and more recently from Prof. J. U. Lloyd, of Cincinnati. The drug consists of the entire fruit, of which the pericarp and the feathery seedercrown must be rejected in the preparation of the tincture, which Prof. Fraser directs to be prepared from the seed, previously deprived of the fixed oil. The active principle strophanthin is found chiefly in the seeds, and, the hairy portion contains the alkaloid ineine which has an entirely different physiological action. That the pods and hairs are likewise poisonous has been shown by Mr. Martindale, in a paper recently published (See AMER. JOUR. PHAR., 1887, p. 99).

Prof. Maisch also exhibited a specimen of *asafetida* which had been sent to him by Messrs. Roller & Shoemaker. It differs in appearance from the drug as usually seen in our market, and consists almost entirely of agglutinated tears, the fresh fracture being milk-white, but the entire surface of the mass becoming, on exposure, of a bright pink color.

The actuary exhibited some specimens of *fruit juices* sent by Messrs. Hance Brother & White, who prepare them very largely, also samples of the syrups made from them; they were of their usual excellence. The exhibit caused a great deal of interesting conversation about the methods of preparing and preserving such juices. It was stated by Prof. Remington that many of the juices, if put into bottles quite hot and filled to the cork, then

secured and kept in a cool place, would keep several years unimpaired. In some cases a few grains of boric acid had been added, but this was not necessary.

Professor Remington asked what was the experience of the members about *keeping lemons* in good condition for neutral mixture. Some members said, that wrapping them in paper, or keeping them in a cool cellar in a box to which the air had free access, would preserve them two or three weeks in good condition. Professor Remington stated that a solution of table salt about the density of sea water would be found effectual for their preservation for five or six weeks at a time; before the juice is expressed, the lemons are well washed with water.

A *Syrup of Gooseberries* as a most excellent vehicle for the administration of Iodide of Potassium was mentioned. In the absence of the fresh fruit or of the preserved juice, the syrup may be made of a jar of Muir's jam of gooseberries to a quart of syrup.

A very neat article for facilitating the work of the dispenser in *numbering prescriptions* was exhibited by Mr. Evan T. Ellis. It consists of a tape on which the numbers are printed in duplicate and rolled upon a spool which is enclosed in a case fastened near the counter; there is attached to it a cutter by which the pair of numbers can be cut off as needed, one of which is affixed to the prescription and the other to the vessel or package in which the medicine is to be sent out. As no two prescriptions can thus have the same number a great source of danger is obviated. After a good deal of conversation it was thought that the device was one which would be of advantage if adopted; it can be had at Mr. Ellis's office, 123 Chestnut street.

The exhibition of this numbering apparatus called forth considerable discussion about the check system in connection with prescriptions, when the opinion was generally expressed that no system should be permitted to supersede the constant vigilance that was necessary in connection with every step in the dispensing of medicine.

Professor Maisch showed a little *pencil for erasing ink stains* which had been sent to him. It was examined by Professor Trimble, and found to be a roll of paper tightly compressed and saturated with citric acid. It is applied to the moistened ink spot with a little solution of chlorinated lime.

There being no further business, on motion adjourned.

T. S. WIEGAND, *Registrar.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

The California College of Pharmacy held its fourteenth annual commencement at Odd Fellows Hall, San Francisco, on November 17, 1886 nine candidates receiving the diploma of Graduate in Pharmacy from the hands of President Holden. Addresses were made by W. M. Searby, Ex-president of the College; by C. C. Stratton, D. D., president of the University of the Pacific, and by Professor E. W. Runyon, Ph. G.

At the annual meeting of the Alumni Association of the same college the usual business was transacted, after which the meeting adjourned to partake of the annual banquet.

The *Chicago College of Pharmacy* held its twenty-second annual commencement in Attfield Hall of the college building when the diploma of Graduate of Pharmacy was bestowed upon forty-four gentlemen.

The exercises on this occasion were of a very interesting and pleasant character; addresses were made by Hon. Ex-Mayor Gilbert, members of the faculty and of the profession, and were responded to by the valedictorian of the class. In the evening the faculty and alumni tendered to the graduating class and some invited guests a banquet at the Palmer House. Covers were laid for 150, and after due justice had been done to the menu, toasts, speeches and gay repartee were indulged in until a late hour.

The *Kings County, N. Y., Pharmaceutical Society* gave a course of lectures during the winter of 1885-86, which were so well attended that a similar course has been arranged for the present winter, is now in progress since November and will continue until spring. The lectures are being delivered by members of the society and others.

The *Rhode Island Pharmaceutical Association* held its twelfth annual meeting in Providence, January 12. Among the reports was one stating that a course of lectures on chemistry was given under the auspices of the Association, and was attended by twenty-five young men. The officers elected for the current year are F. J. Phillips, president; A. W. Wellington, secretary; and A. W. Farmer, Jr., treasurer.

The *Illinois Pharmaceutical Association* held a special meeting in Springfield on January 13th and 14th with the view of considering amendments to the pharmacy law. The amendments adopted with the view of submitting them to the legislature contemplate:

- 1st. To pay the expenses of the State Board of Pharmacy and thus do away with the annual registration fee.
- 2d. To abolish diploma distinctions, so that all persons asking registration in future will be compelled to demonstrate their ability as practical pharmacists.
- 3d. To so amend the pharmacy law that none but registered pharmacists shall be allowed to sell *any kind* of drugs, medicines, or poisons.
- 4th. To give registered assistants the privilege of registering as pharmacists.
- 5th. To exempt pharmacists from jury duty.
- 6th. To provide for the issuing of a minor certificate, and separation of the office of Secretary and Treasurer of the Board of Pharmacy.
- 7th. To empower the Board to elect their Secretary either from or outside of their membership, as in their judgment, will be for the best interest of all concerned.

The *Connecticut Pharmaceutical Association* met in annual meeting at Meriden February 1st and 2d, at which the address of the president and the usual reports of the officers and committees were presented. Several papers were read, and a number of pharmaceutical and chemical preparations were exhibited by the members, for which prizes were awarded.

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COLLEGE OF PHARMACY
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TORONTO.

THE AMERICAN
JOURNAL OF PHARMACY.

APRIL, 1887.

ESSENTIAL OIL PAPERS.

BY ALBERT M. TODD.

1. THE POLARISCOPE AS A REVEALER OF ADULTERATIONS.

During the month of February last, being the guest of S. P. Duffield, M. D., Ph. D., of Dearborn, Michigan, with whom I was associated in conducting some analyses of spurious oil of peppermint, in behalf of our State, my attention was called by that gentleman to a Mitscherlich polariscope of especial fine construction, made by Desaga, of Heidelberg, and brought to this country many years ago, when the doctor returned from studying with Liebig. That this instrument as an investigator of essential oils is so little known and understood, seems marvelous. The standard and official books to which we refer (pharmacopeias and dispensatories) are entirely silent as to the polarizing test on many essential oils; and when it is mentioned, give only the fact as to the oil being dextrogyre—polarizing to the right, or lævoygyre—polarizing to the left, the *angles of polarization*, which are of most vital importance not being referred to.

The reason of this deficiency is probably due to the fact that the authors of our scientific books have not had the facilities for distilling personally the oils under examination; and finding wide variations, owing to impurities, not having certain knowledge which was pure and which not, they were unable to lay down the limits with sufficient closeness.

The immediate cause of our associated analyses was the confirmation of some tests which I had hastily made in court regarding some adulterated essential oils which had been sold to a large extent, the inferior quality of which had been supposed to be entirely due to dementholization—the oil showing that test; but which I found to be chiefly attributable to adulteration with refuse oil of camphor. The oils in

question originated in the city of Detroit, and had been scattered throughout the country to a vast extent, being transferred secretly to agents who represented themselves as the bona fide producers, and the quality as genuine.

As Dr. Duffield kindly extended not only the hospitality of his home, but the use of his laboratory, for the purpose of arriving at more exact conclusions, I took with me a number of samples of my own distillation, besides others with the quality of which I was fully acquainted. The results were that though different pure samples varied in the angle of polarization, there were found to be *limits* beyond which pure samples did not go. In the case of oil of peppermint adulterated with oil of camphor (the latter is dextrogyre, while the former, as is well known, is lævogyre), a most valuable test was found by polarization, especially valuable from the fact that oil of camphor, being so soluble, limpid and volatile, and yielding no distinct chemical reactions had recently become the most dangerous adulterant known, being used to an enormous extent.

Regarding the instrument in question, a description of its construction may be found in Tucker's work on sugar analysis. I will briefly say for those who cannot conveniently gain access to that work, that its practical results are that "an angle of polarization" may be found by carefully revolving an index round a graduated circle, divided in 360 degrees. A "perception tube" (which in the case of this instrument was 200 millimeters in length) is placed between two refracting prisms. The graduated circle is marked off in degrees commencing at a point perpendicular to the centre of the circle. From this point the degrees number both to right and left, meeting at 180 on the opposite or lower side of the scale. The "polarizing angle" is found by filling the perception tube with the oil and turning the index until a point is found to the right or left where the violet and red rays of the spectrum unite *before the 90th degree is reached*. For instance if the red and violet colors of the spectrum unite at the 50th degree to the left, the angle of polarization is said to be -50° , and the oil lævogyre, or "polarizing 50° to the left." It should be observed that this same phenomenon will be also visible to the right on the point *exactly opposite*, which, however, in the case referred to, would be *beyond the 90th degree*.

Now, if it is found that a certain essential oil polarizes within certain limits, if such oil is mixed with another polarizing with entirely

different limits, this difference in the polarizing angle will determine an adulteration. And where *dextrogyre* oils are adulterated with *lævo*-gyre oils, a most valuable test is obtained in *quantitative analysis*, as well as qualitative, its delicacy being proportioned to the variations between the two oils and the narrow limitations which each has by itself when pure. For instance, if it is found that a certain essential oil always polarizes between -50° and -60° to the left, and another oil always between $+50^{\circ}$ and $+60^{\circ}$ to the right, it follows that there is a difference between these two oils of 100 to 120 degrees; so that if mixed in equal proportions, the angle of polarization would be near zero on the scale.

Now, as to the test in question, five samples of pure Wayne county peppermint oil were examined, which polarized as follows: -55° , -46° , -46° , -52° , -52° , averaging -50.2° . Five samples of natural oil of camphor were also examined, the average of polarization being $+65^{\circ}$, making the average difference between the camphor and peppermint oils 115.2 degrees. Five samples of the adulterated oil were now examined, which were found to average -9° , being deficient from the average of Wayne county oil 40.8 degrees. This deficiency as compared to the difference between the Wayne county peppermint oil and the oil of camphor, showed an adulteration of 115.2:41.2 or 35.8 per cent.

For the purpose of analyzing the adulterated oils further, I submitted them to fractional distillation in ten fractions, which exhibited great differences in polarization, *seven of these fractions polarizing to the right*, which would indicate more than 50 per cent. adulteration. The fact of a polarizing test showing such a great amount of adulteration may be due to oil of camphor having been exclusively used which polarizes as nearly to zero as possible.

The tests of the adulterated oils, when divided into ten fractions, as to specific gravity, polarization and boiling points are as follows, the oil being distilled in a glass retort with as gentle a heat as possible, over a wire cloth without the addition of water:

No. of Fraction.	Polarization.	Sp. Gr. At 15.5°C .	Boiling Point. Centigrade.
1	+30 (to right)	.9115	182°
2	+29 "	.9145	185
3	+28 "	.9205	188
4	+21 "	.9265	192
5	+17 "	.9315	197

6	+10.5 (to right)	.9385	202
7	+ 1 "	.9444	207
8	— 8.5 (to left)	.9480	211
9	—21.5 "	.9526	214.5
10	None.	.9734	—

When nine full fractions had been distilled, it was found that no more could be recovered, which was sufficiently translucent to admit of polarization. The residuum in the still being of a tarry consistency and quite opaque, distillation was stopped and the residuum drained from the retort, this representing the 10th fraction.

Another feature of the fractions of the adulterated oil is that the specific gravity rises continually with each succeeding fraction, whereas in the fractional distillation of pure oil of peppermint, the specific gravity rises with the first few fractions, *then falls* until a specific gravity is reached, about equivalent to the third fraction, *and then again commences to rise*, this time with increased rapidity. This phenomenon I had the pleasure of calling attention to in the Proceedings of the American Pharmaceutical Association for 1885, page 579.

After an examination of a great number of samples of pure oil of peppermint, collected specially from all parts of the world, I find *but one* sample the *impurity* of which is not established, that polarizes at a less angle than -38° . The *highest* polarizing point obtained in pure oil of peppermint was a sample distilled from plants which I *had dried for six months* before distillation, which experiment is referred to in the September number of *The American Druggist*. This polarized at -74° .

Upon comparing the same oil before dementholization and after, I found the angle of polarization lessened three degrees by dementholization, the amount of menthol extracted being 16 per cent. Pure menthol (being melted, of course, to form a liquid), I find does not polarize distinctly; *but when added to natural oil increases the polarizing angle*. I farther found that the effects of *temperature* on the polarizing angle are very slight, and not (as has been supposed) such as to materially affect the test. For determining this, oils both dextrogyre and lævogyre were used, with the result that for a variation of 115° F. the angle of polarization was changed but three degrees, or but little more than one-fourth of one degree for each ten degrees of temperature; so that experiments made with the polariscopes at ordinary temperatures, say from 55 to 75° F., would vary but a fraction of a

degree. In the test of specific gravity such variation in temperature would make considerable difference.

The one single sample of oil of peppermint regarding which I am not satisfied on account of its polarization, was grown in Kalamazoo county, Michigan. It polarized at -29° . Whether this is due to peculiar soil, or some subtle adulteration, is yet to be investigated. Among other notable results, was the test of an oil marked "German" polarizing at -14° , heavily adulterated with oil of pennyroyal and "Japanese peppermint" (*Mentha arvensis*). Another was the fraudulent brand called "Michigan county oil peppermint," to which I have formerly referred, showing by fractional distillation, 50 per cent. oil of turpentine, and which polarized at -5° . Another sample representing one thousand pounds of dementholized oil, from Detroit, polarized at -38° .

While carrying on the experiments with the polariscope, Dr. Duffield made some most interesting experiments with an optical instrument invented by Prof. Abbe of Germany, named the "Refractometer." This delicate and beautiful instrument arrived at the doctor's laboratory during the week of my visit; he having worked with it recently with Dragendorff at Dorpat, Russia, ordered one constructed for himself before returning home. The determinations of this instrument are based upon the refractive power of a liquid, which is shown on a finely graduated scale, similar to that of the polariscope. This instrument, like the polariscope, is quite expensive and rare in this country. While it requires more skill and care in adjusting and using, its utility consists in the fact that but a single drop of liquid is required.

Through the courtesy of Dr. Duffield, I have been furnished with a table of the "indices of refraction" of many of the samples already mentioned, and the relationship of polarization to refraction will form an interesting subject for future investigation.

Beside the value of the polariscope in determining adulterations of leavogyre essential oils with oil of camphor it is also most valuable in determining adulterations of oil of *erigeron* with oil of turpentine, as the former is leavogyre; also in determining the genuineness of oil of *true fireweed*, for which, heretofore, *erigeron* oil has been mostly substituted, and for which no chemical test had yet been known, while oil of *erigeron* polarizes about 50° to the left, the oil of *true fireweed* (*Erechthites hieracifolia*) polarizes 44° to the right; consequently those

oils, which heretofore have been difficult to distinguish on account of similar chemical and physical tests, (though varying greatly therapeutically) can now be readily distinguished.

At the request of Prof. J. U. Lloyd, I am now engaged making some special investigations in the oils of fireweed and erigeron, having distilled them in twenty fractions; the results of which may form the subject of another article.

ISOMERIC FORMS OF FERRIC MULTIPLE CITRATES.

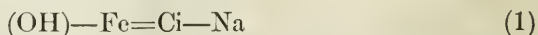
BY R. ROTHIER.

The market supplies two pretty distinct kinds of normal ferric citrate, as the writer had previously pointed out (*AMER. JOUR. PHAR.*, Oct. 1885).

It is not implied that these are metameric forms of 'one another.' The ruby tinted kind is simply an impure article which in consequence of extraneous or disproportional admixture, always yields an appreciably smaller product of double salt than is theoretically indicated. But the product as a rule does not materially differ in character from that given by the garnet tinted citrate.

It is well known that elixirs containing citro-salts of iron with cinchona alkaloid salts are extremely prone to discoloration. Neither does this indicate a constitutional transformation of the iron compound. The effect is certainly attributable to the agency of the acidic radicles in perverting the sugar of the excipient, the alkaloid or both. Day light when permitted to obtrude is doubtless also a perceptible factor in the case, and may here be instrumental in reducing the iron to the ferrous state providing no means are present for retaining or re-converting it as ferric salt.

The writer has elsewhere (*AMER. JOURN. PHAR.*, April 1883) pointed out that the constitutional symbols of the ferric citro-salts are legitimately expressible in alternative forms rationally indicative of metameric products. The writer has succeeded in obtaining at least two well marked compounds of this nature. When for instance one molecule of ferric citrate previously dissolved in water by means of heat, reacts with one molecule of sodium bicarbonate the compound constitutionally symbolized as follows results:



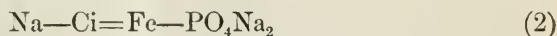
By treating this sodio-ferric hydro citrate with one m. of disodic

phosphate and evaporating the red-brown solution to dryness at a gentle heat a red-brown scaled salt of ready solubility and alkaline taste is obtained. Its empirical formula is $\text{FeNa}_3\text{CiPO}_4\cdot\text{Aq.}$ and molecular weight 427.

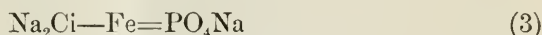
If the ferric citrate is first treated with the sodium phosphate and then with the bicarbonate a green solution results which on careful evaporation yields a gray-green scaled salt of ready solubility and alkaline taste. Its empirical expression is $\text{FeNa}_3\text{CiPO}_4\cdot 2\text{Aq.}$ and molecular weight 445.

The first of these two salts when mixed with elixir of cinchona prepared from the sulphates of the cinchona alkaloids gives after some time a scanty deposit of crystals. The second of the salts when treated in the same way gives instantly a more decided precipitate of minute crystals than the former salt.

As deduced from its manner of generation the constitutional symbol of the red salt may be written



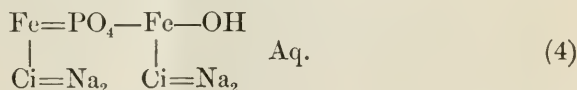
and that of the green salt



When two ms. of ferric citrate is treated with two ms. of sodium bicarbonate so as to form the basic citrate already noted above and if this product be then treated with one m. of disodic phosphate a compound results whose empirical formula may be written

$\text{Fe}_2\text{Na}_4\text{Ci}_2\text{PO}_4\text{OH. Aq.}$ and having a molecular weight of 712.

On first treating the citrate with the sodic phosphate and then with the carbonate an apparently identical result is obtained. From an inspection of the two rationally possible constitutional symbols given by the data in these cases it becomes evident that only one of the structures is chemically possible, as follows:

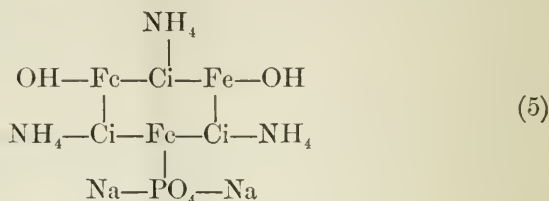


The compound has an alkaline taste and renders elixir of cinchona shortly turbid with a crystalline precipitate.

On substituting ammonium bicarbonate for the corresponding sodium salt in this instance evolution of ammonia occurs after addition of the phosphate on warming. As during evaporation ammonia is continually dissipated no determination of the result was made. The

compound gives a scant product of distinct crystals with elixir of cinchona only after several hours standing.

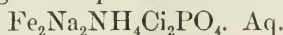
By reacting on three ms. of ferric citrate with three ms. of ammonium bicarbonate and one m. of disodic phosphate a red-brown, readily scaling salt is obtained which may be structurally symbolized by:



It is anhydrous and its molecular weight is 964. During its course of preparation no ammonia is abandoned as in the preceding case. When mixed with elixir of cinchona no precipitate occurs even after long standing. The structural and chemical possibilities point to an isomeric salt but its production was not attempted.

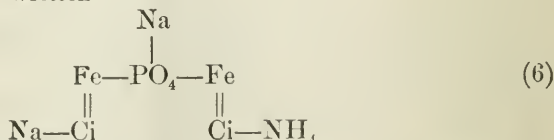
This statement has reference only to the distribution of the acidic radicles in the main group. But when regard is also had to the arrangement of the monad basic radicles a greater number would be possible. In the structural form last given the writer has assumed the retention of all the sodium originally combined with the phosphoric radicle. Yet there is no evident reason for the contrary that half or all is replaced by ammonia radicles.

Elsewhere (*AMER. JOUR. PHAR.*, April 1883) the writer recommended a salt derived from two ms. of ferric citrate, one m. of sodium bicarbonate and one m. of disodic phosphate. On recently substituting ammonium bicarbonate for the corresponding sodium salt a product was found having the empirical formula



and the molecular weight 667.

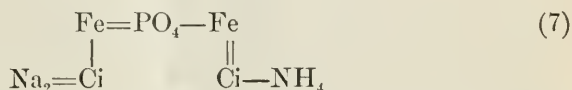
The constitutional symbol as deduced from the order of uniting the constituents might be written



There are a number more of well characterized symbolic forms that could be assigned to this compound independent of the order of mixture.

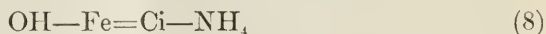
It would though be a very difficult matter to ascertain the identity of the products. Furthermore the possibilities of transformation by even moderate heat or merely time at ordinary temperatures are so immanent that scarcely any certainty can prevail in this regard. The effects of heat either alone or in conjunction with other agents in the production of metamerism are predominant. It is the writer's belief that metameric states are the result of intramolecular substitution primarily engendered and sustained by heat.

If for illustration in the last formula, the effect of heat should momentarily weaken a ferric radicle either citric radicle might attract the basic residue joined with the phosphoric residue. This action would momentarily strengthen the phosphoric radicle with a tendency to the incidently freer iron. Should the new combination be firmer as regards heat a more permanent compound of the following structure would result :



Whatever the intra-molecular condition may be this much is certain that the salt has a very light apple-green tint, a sweet acidine taste, scales finely and does not precipitate elixir of cinchona.

A remarkably small amount of heat often suffices to induce intra-molecular change as well as molecular disintegration of chemical compounds ordinarily stable. The writer has elsewhere stated (AMER. JOUR. PHAR., March 1883) that when equal equivalents of ferric citrate and sodium bicarbonate react a hydrocitrate of sodium and iron results. But when two equivalents of the carbonate is added only half the carbonic anhydride is expelled. The writer has since found that the action of ammonium bicarbonate is analogous. Yet when the two equivalent carbonate solution is evaporated half the ammonia and all the carbonic anhydride is dissipated whilst the monammonic hydro-citrate



remains in elegant red-brown scales. When caustic ammonia is added to ferric citrate to saturation two equivalents of the base are absorbed. On evaporating the solution by means of a moderate heat the hydro-citrate just noted only remains. These results show that an excess of free volatile base or its carbonate when added to ferric citrate suffer total expulsion when heated to dryness. A so-

lution of ferric citrate supersaturated with ammonia, on evaporation to a syrupy residue will have parted with the excess of base, but if the supply be maintained till utter dryness two equivalents of it will be retained.

In the process for preparing the official ammonio-citrate of iron all excess of ammonia above one equivalent, if present, is consequently evolved. Hence it follows that the official salt is the hydro-citrate first mentioned. Its empirical formula is therefore



and its molecular weight 280.

When mixed with elixir of cinchona it occasions no precipitate.

Owing to the proneness of green ferrated elixirs to deteriorate in color the writer would suggest the use of hydro-citrates which impart a more permanent and uniform red-brown tint.

For a simply ferrated elixir of cinchona the official ammonio-ferric citrate (symbol 8) is readily applicable. When a phosphated iron is deemed more desirable the hydro-citrophosphate of symbol 5 is suggestive. In such cases where a green phosphated elixir is preferred the compound of symbol 6 would be more suitable than pyrophosphate of iron.

In preparing the ammonio-citrate of iron of the Pharmacopœia the writer would recommend that 272 parts of ferric citrate be dissolved in three or four times its weight of water with heat, 79 parts of ammonium bicarbonate be then added and the solution concentrated and the salt be obtained in scales by the usual method.

For preparing the red phosphated compound for use in elixirs (symbol 5) 816 parts of ferric citrate is dissolved in three or four times its weight of water with heat, 237 parts of ammonium bicarbonate is then added and, when effervescence has ceased, followed by 358 parts of disodic phosphate. The solution will be ready for use when all the phosphate is dissolved. This compound is more conveniently prepared by dissolving 840 parts of the official ammonio-ferric citrate in twice its weight of water and then adding 358 parts of sodium phosphate.

The green phosphated compound (symbol 6) may be prepared by dissolving 544 parts of ferric citrate in three or four times its weight of water, adding 79 parts of ammonium bicarbonate and then 358 parts of sodium phosphate.

NEW COMPOUND VALERATES.

By R. ROTHER.

There is a considerable number of strictly monobasic acids which generate multiple and acidic salts that are the exact analogues of compound salts derived from polyhydronic radicles. That some mode of chemism not expressible in unit valence binds the molecules together is undoubted. The writer has heretofore in explanation of this state assumed a coalescence dependent upon fractional bonds and preferably assigned this union to the basic rather than the acidic part of the saline compact. But the writer now believes that a more comprehensive view of the case results by assuming a polymerization of the implicated acidic radicle. Thus taking, for instance, a double molecule of chlorhydric acid and representing it by $H_2(Cl_2)$ we may replace half the hydrogen by a quinium residue and obtain acidic quinium chloride $(QuH)H(Cl_2)$ an authenticated salt. When quinine as free base is added in excess to ferric chloride, ferric hydrate is precipitated. On adding chlorhydric acid just sufficient to dissolve the hydrate and then adding quinium chloride as long as combination results a chloride of iron and quinium is obtained which may be represented by $Fe(QuH)(Cl_4)$.

When its solution is evaporated spontaneously or with a gentle heat, the double salt remains as a nondeliquescent red-brown amorphous readily soluble mass. On a former occasion (AMER. JOUR. PHAR., June, 1884) the writer stated that the crystallized ammonium valerate of the market is an acidic salt of valeric acid, but its exact composition was not ascertained. Recently the writer experimented with magnesium carbonate on this compound. From the proportion of carbonate then dissolved it was deduced to be a diacidic valerate having the formula $(NH_4)H_2(Va_3)$. The ammonium and magnesium valerate $NH_4Mg(Va_3)$ thus resulting has an exceedingly sweet taste, free from valeric flavor or bitterness. Its odor is but a faint reminder of its origin. It may be manipulated and exposed with impunity without tainting the atmosphere with the disagreeable aroma of valeric acid. This compound salt is extremely soluble, but can readily be obtained as a nondeliquescent crystalline mass on evaporating its solution to a syrupy consistence. Viewed under the microscope with a half inch objective it is seen to be made up of spinules arranged in star-shaped groups. Its appearance in polarized light is very fine.

This salt is soluble in alcohol in all proportions, but the residue left on evaporation gives no satisfactory appearance under the microscope. When valeric acid is treated with excess of magnesium carbonate in the presence of water a solution of magnesium valerate results. This solution, whether concentrated or dilute, appears to be acted on by the carbonic anhydride of the atmosphere, as a thin insoluble pellicle of magnesium carbonate soon covers the surface. In consequence the dry salt cannot be secured entirely free from this contamination. Nevertheless the salt gives a very satisfactory appearance with the microscope whilst the polariscopic effect is very pleasing. The crystals have the form of delicate branched wavy filaments emanating from a center. This salt has an all-proportional solubility in alcohol which solution leaves an amorphous residue. This with a half-inch objective and B eye-piece is seen covered with branched, wavy striæ. The alcoholic residue differentiates no colors with the polariscope.

Magnesium valerate forms a compound salt with quinium valerate of extreme solubility in water and in alcohol. The aqueous solution is only stable when highly concentrated, since the addition of water at once precipitates the greater portion of the quinium salt. An aqueous solution containing some alcohol remains intact whether strong or dilute. Such a solution can be heated with impunity during evaporation without separating quinium valerate providing some alcohol is continuously present. Toward the last all the alcohol must be dissipated in order to permit crystallization. The dense residue when left at rest sets to a crystalline mass after some time. But if stirred for a short time after a rather dense pellicle has covered the surface congelation of the whole mass immediately takes place, leaving a perfectly dry salt. Its appearance under the microscope resembles that of magnesium valerate. The writer believes that the formula $(\text{QuH})\text{Mg}(\text{Va}_3) \cdot x \text{Aq.}$ represents its composition.

Although magnesium valerate in aqueous solution suffers decomposition on exposure, the compound salts remain unaffected. In the dry state, the compound salts are wholly odorless whilst their solutions have but a feeble valeric odor; owing to their rather agreeable flavor and inobtrusive odor they commend themselves instead of the simple salts. The writer would suggest an elixir of ammonium and magnesium valerate.

Great convenience results from having in stock an aromatized li-

quor for general use in the preparation of elixirs. Such a liquor might be termed an alcarome. In a general way glycerin appears better applicable than sugar as a sweetening for elixirs. The mixture of three measures of alcarome with one measure of glycerin might then be appropriately designated as a glycarome.

The writer prepares alcarome by separating the shells from three drams of cardamom and triturating the grains to a fine powder. One and a half troy ounces of coriander is then also finely powdered. The two powders are then mixed with ten drops of oil of cassia and half a troy ounce of powdered magnesium carbonate. This powder is now added to a mixture of 2 pints of alcohol and 4 pints of water. The whole is set aside for several days, well shaken at intervals, then poured into a filter and the filtrate brought to the measure of six pints by the addition of enough ($\frac{1}{3}$) alcohol through the filter.

To prepare elixir or rather glycarome of ammonio-magnesium valerate, one troy ounce of valerie acid is mixed with 6 fluidounces of water and 125 grains of ammonium bicarbonate. After all the bicarbonate is added and decomposed an excess (about 3 drachms) of magnesium carbonate is incorporated during occasional stirring. One drachm of cochineal is now rubbed to a fine powder and mixed with the solution of the valerates. The mixture is then poured into a filter and when all the liquid has passed down, followed by alcarome until 24 fluidounces of filtrate is collected. To this, 8 fluidounces of glycerin is added and the whole well mixed.

ANTISEPTIC COTTONS AND GAUZES.

BY JOSEPH W. ENGLAND, PH.G.

Read at the Pharmaceutical Meeting, March 22.

Pilcher, in his "Treatment of Wounds," from whose work some of the formulas herein given are taken, as there expressed or modified, says that "Septic infection is to be guarded against by covering the parts with soft and absorbent material that will receive and keep aseptic the discharges that drain away from them and that will purify from septic particles the air that passes through them to the wound. For this purpose many substances will be found useful. Among those more commonly employed are cotton-wool (absorbent cotton), loosely woven cotton-cloth, gauze and lint, tow, jute, turf-mould, charcoal,

sand and saw-dust. To the natural absorbent properties of these materials it is necessary only to add the presence, throughout their substance, of a sufficient amount of some antiseptic material to destroy or render inert any septic germs that may be brought in contact with it. Materials thus prepared constitute the antiseptic dressings."

Antiseptic Cottons.—This comparatively new class of products has lately, more especially through the published researches of Sir Joseph Lister, found extensive application in Europe and the United States, as a dressing in the antiseptic treatment of wounds. They have been prepared, only to a limited extent by pharmacists; the manufacturers of cotton and surgical dressings having had under their control almost the entire production. Their preparation involves no especial difficulties in work or appliances used and opens up a new field of labor to the pharmacist who is desirous of extending his work in all profitable directions of his profession. It is more than probable that the cause of this delay may be found in the limited demand upon pharmacists for the articles, many physicians purchasing direct from dealers in surgical dressings; and secondly, through their hesitation, in the lack of practical knowledge, as to the proper methods of procedure. The first cause can be eliminated; the second, the writer will endeavor in a measure to supply by giving the formulas necessary, with results of his personal experience in their preparation for hospital employment.

Borated Cotton.—Since, according to the Pharmacopœia, boric acid is readily soluble in 3 parts of boiling water and 25 parts of cold water, it is evident that hot water will readily dissolve 15 per cent. of boric acid and precipitate a very large proportion on cooling, and, if purified cotton be treated with an equal weight of a hot aqueous solution of the acid of that strength and dried it will, of necessity, contain 15 per cent. of the acid; a very desirable strength to insure its antiseptic properties. But in practice it will be found that cotton readily absorbs from about four to five times its weight of water; the exact proportions varying with the absorbency of the cotton, the quantities of antiseptic cotton made at a time, the manner of impregnating with the medicated solution and the degree of subsequent expression. Hence it is better to make the water four to five times the weight of cotton used, impregnate in thin layers in a flat, open vessel and express moderately or in such a manner that after all the cotton has been treated there will be no medicating liquid left. Borated cot-

ton thus prepared, has the acid intimately incorporated into its fibres and is free from loose particles of crystals among its meshes.

Boric acid.....	80 gm. (2 oz. av. and 360 grs.)
Boiling water.....	1814 gm. (4 lb. av.)
Absorbent cotton.....	453.5 gm. (1 lb. av.)

Dissolve the acid in the boiling water, impregnate the cotton, express and dry by exposure to the air or slight heat. Borated cotton thus made contains exactly, in the finished product, 15 per cent. of its weight of acid. The use of a Troemner solution balance, will greatly facilitate the weighing of quantities in this, as well as in all other formulas herein given.

Benzoated Cotton.—As benzoic acid is soluble in 15 parts of boiling water, the same general method followed in the case of borated cotton, can here be duplicated; using, in addition, a small percentage of glycerin to prevent separation of crystals in the finished product. The strength is 15 per cent. of acid.

Benzoic acid.....	90 gm. (3 oz. av. 76 grs.)
Boiling water.....	1814 gm. (4 lb. av.)
Glycerin.....	57 gm. (2 oz. av.)
Absorbent cotton.....	453.5 gm. (1 lb. av.)

Proceed as before.

Salicylated Cotton. This is generally made 10 per cent. in strength, with water, alcohol and a small proportion of glycerin to prevent the shaking out, after drying, of the crystals contained in the interstices of the fibres. The following is the formula used:

Salicylic acid.....	57 gm. (2 oz. av.)
Alcohol.....	453.5 gm. (1 lb. av.)
Hot water.....	2268 gm. (5 lb. av.)
Glycerin.....	57 gm. (2 oz. av.)
Absorbent cotton.....	453.5 gm. (1 lb. av.)

Mix the acid, in a porcelain or wedgwood mortar, with the glycerin, dissolve with added alcohol, place the solution in a large, flat, open vessel and lay upon the surface of the liquid the cotton in thin layers. After standing for ten minutes in this liquid and absorption is completed, remove, express and lay aside to dry upon a frame. The method of expression may be with the use of the hands, but a better way is between the open rollers of a clothes-wringer so provided that they are not too tightly screwed together. Pilcher observes, that the antiseptic qualities of this cotton may be still further enhanced if before using, a thin layer of it be dipped in a 10 per cent. solution of the

acid, in glycerin, applying this to the wound, first, and then following on top, with a thick layer of dry salicylated cotton, sufficiently wide to extend beyond the outer limits of the wound, on all sides.

Naphthalinated Cotton is made by soaking absorbent cotton, in thin layers, in a saturated solution of naphthalin in petroleum benzin which dissolves about one part of the former to six parts of the latter, expressing and drying. The following is the formula:

Naphthalin.....	453.5 gm. (1 lb. av.)
Petroleum benzin.....	2732 gm. (6 lb. av.)
Absorbent cotton.....	453.5 gm. (1 lb. av.)

Iodoformized Cotton. Lister accords little value to the antiseptic qualities of iodoform in this shape. It may be made, however, by this formula:

Iodoform.....	24 gm. (370 gr.)
Ether.....	250 gm. (8 oz. av., 358 gr.)
Alcohol.....	750 gm. (26 oz. av., 198 gr.)
Absorbent cotton.....	453.5 gm. (1 lb. av.)

Dissolve the iodoform in the ether, add the alcohol and proceed in the usual way or, if desired, the cotton may be prepared, extemperaneously, by rubbing the iodoform thoroughly into it and shaking out any excess. As made above, it contains 5 per cent. but can be increased to a much greater strength if wished.

Carbolized Cotton. Cheyne states that this can best be made by soaking sufficient absorbent cotton in a one per cent. solution of carbolic acid in ether, drying at once and using immediately. Any value that it may possess at first, which is questioned, is almost *nil*, after keeping for a time, from the volatility of its active constituent and it is seldom, if ever, employed, especially in view of the great superiority of the carbolized gauze.

Sublimated Cotton. This cotton is readily made by the following modification of Rummel's formula, and contains one-half of one per cent. of the poisonous mercurial chloride:

Corrosive sublimate.....	2.5 gm. (39 gr.)
Alcohol.....	57 gm. (2 oz. av.)
Water.....	1814 gm. (4 lb. av.)
Glycerin.....	57 gm. (2 oz. av.)
Absorbent cotton.....	453.5 gm. (1 lb. av.)

Dissolve the sublimate in the alcohol, add the water and glycerin, impregnate the cotton and proceed in the usual way.

Gauzes. Loosely woven cotton cloth or, as it is commercially known, cheese cloth is much more largely used as an absorbent dressing, impregnated with various antiseptics, than cotton or any other material. It is technically termed "gauze," and its relatively large open mesh-work renders it peculiarly adaptable for the absorption and retention of matter issuing from wounds. It is the basis of the larger number of antiseptic dressings first introduced by Lister,¹ in applying the so-called "Lister Antiseptic Treatment." It is generally cleansed and purified, prior to medication, by first washing with a solution of sodium carbonate and then chlorinated lime, followed by water.

Carbolized Gauze. This is by far the most important and the most in demand of all the gauzes and enters into medical practice whenever the Lister dressings are employed. It is very apt to deteriorate on keeping from the volatilization of its contained carbolic acid, but this can, in a very large measure, be prevented if the finished product be wrapped in paraffin paper. The formula employed is based to a certain extent upon that of Von Brun's (carbolic acid 10 parts, resin 40 parts, castor oil 8 parts and alcohol 200 parts), but it varies in containing glycerin in the place of the oil, and, in addition, petroleum benzin. The following formula contains 10 per cent. in weight of carbolic acid, in the finished product :

Carbolic acid.....	239 gm. (8 oz. av., 188 gr.)
Alcohol.....	1200 gm. (42 oz. av., 144 gr.)
Glycerin.....	150 gm. (5 oz. av., 127 gr.)
Resin.....	300 gm. (10 oz. av., 255 gr.)
Benzin.....	1400 gm. (49 oz. av., 168 gr.)
Gauze.....	1700 gm. (59 oz. av., 423 gr.)

Triturate the resin in a mortar with the benzin, add the alcohol, in which has been dissolved the carbolic acid, and then add the glycerin. Lastly soak the gauze, in 3 or 6-yard pieces, in this mixture, kneading well, to secure uniform diffusion ; express and hang the gauze on frames to dry. It dries very quickly, after which, fold in rolls and wrap up in paraffin paper. In order to increase the efficiency of the gauze, it has been recommended that the layers of gauze, prior to application, be dipped in a 1 to 40 aqueous solution of carbolic acid.

In this gauze the acid is, of course, the active ingredient. The resin is used to prevent the washing away of the acid by the discharges from the wound, while the glycerin is employed to make the resin less

¹ *British Medical Journal*, Jan., 1871, p. 187.

brittle, and help, also, the retention of the acid in a more than ordinarily soluble form. Benzin is used to reduce the cost.

Sublimated Gauze.—This dressing is occasionally employed, but not nearly to the same extent as carbolized gauze. It contains 1 part in 2000, or $\frac{1}{20}$ of one per cent. of its active constituent.

Corrosive sublimate	0.85 gm. (13 gr.)
Alcohol.....	28.5 gm. (1 oz. av.)
Water.....	2268 gm. (5 lb av.)
Gauze.....	1700 gm. (59 oz. av., 423 gr.)

Dissolve the sublimate in the alcohol, dilute with water and treat the gauze, in layers, with the liquid. Hang up to dry.

Absorbent Canton Flannel.—Under this term we use, in the Philadelphia Hospital, a canton flannel rendered absorbent by boiling in a 3 per cent. solution of caustic soda for $1\frac{1}{2}$ or 2 hours, until all the fatty matter in the fibres is decomposed, then washing in several portions of cold water, then macerating for 10 or 15 minutes the product in a 1.5 per cent. solution of hydrochloric acid, whereby any traces of free soda are neutralized, and the fibres of the goods are whitened; and, lastly, followed by several washings in water, wringing out with a machine and drying. This product has been found to be peculiarly serviceable in hospital practice as a cheap, efficient and reliable substitute for all the minor cases where at present the so-called patent lint is generally demanded; for example, in local applications of lotion of lead water and laudanum, and as a dressing with various ointments upon chronic sores, ulcers, etc. The proof of its utility may be inferred from the fact that while we used, during 1886, 1500 yards of patent lint, we used, also, 2500 yards of this absorbent canton flannel. In cost it is almost one-half of that of patent lint.

Ap[ro]pos of the subject of antiseptics, the author was led some months ago to advocate the use of *iodized starch* as an addition to our rapidly growing list of these compounds. Reasoning that the antiseptic activity of iodoform and bismuth subiodide must depend, in part or in whole, upon the iodine freed in their decomposition, in contact with decomposing putrescent organic matter, it was thought that if an iodized compound, readily decomposable, was subjected to the same conditions, that it would induce the same healthful process in the latter case as well as in the first. Full experience has demonstrated the value of the theory in this instance, and iodized starch is now used daily in our hospital practice, and recognized as a valuable adjunct in

certain forms of antiseptic treatment. It is applied in the same manner as other antiseptics, namely: first washing out the wound with pure water, and drying out as far as practicable, then thoroughly dusting in with iodized starch and covering the wound, even beyond its outer edges. The applications are generally made in the morning and evening.

In the removal of the dressings the absorption of the iodine is most strikingly shown. Whereas, in the central parts of the wound, where the exuding pus or matter has come in contact with the bluish-black powder, the same has become wholly decolorized, and shows the white color of the starch, yet, around the outer limits of the dressing, where no excretive matter has exuded, the bluish-black color remains unaffected.

Then comparative trials with iodoform, subiodide of bismuth and iodized starch have demonstrated that it possesses valuable antiseptic qualities as a dressing, and though it may not be superior to the first two named, yet, at the same time, it has occasionally succeeded where they have given unsatisfactory results.

In its preparation the pharmacopœial method, given under "Amylum Iodatum," has been followed, namely, the trituration of 5 parts of iodine with a small quantity of distilled water, and the gradual addition of 95 parts of powdered starch, until the compound has assumed a uniform, bluish-black color. Then dry at a temperature not exceeding 40° C. (104° F.), powder and bottle or box.

ESTIMATION OF ALKALOIDS IN NARCOTIC EXTRACTS.

BY EUGEN DIETERICH.

Translated and abridged from *Pharmac. Centralhalle* 1887, by Geo. H. Ochse, Ph. G.

The examination of all extracts regarding their value is obviously a necessity, and in the case of narcotic extracts is sure to be satisfactory because we are dealing with fixed and known chemical compounds, namely the alkaloids. A narcotic extract to be normal must contain a certain quantity of alkaloid and should it contain a smaller quantity, be it caused by careless preparation or sophistication, it must be rejected.

The requirements which the present German Pharmacopœia exacts (description of the color and formation of limpid or turbid solution) are evidently unsatisfactory and demand a decided correction considering the importance of such medicaments as the narcotic extracts. Re-

cent publications by Kunz and Schweissinger and also Leuken, who merely gave reactions for their identity, have stimulated a desire for further research. With a view of making the examination of narcotic extracts also a subject for study Dieterich makes a critical comparison and gives figures after trying all known methods. He obtained from extracts of belladonna, aconite, digitalis and hyoseyamus all the reactions mentioned by Leuken; but the differences in color between violet and raspberry red and the differences between heavier and lighter precipitation and color (difference between belladonna and hyoseyamus) are not so great as to allow one with limited experience to come to any positive conclusions. Schweissinger's assertion that unsophisticated extract of belladonna does not reduce Fehling's solution has not been confirmed and has since been retracted by him.

Schweissinger's method for determining the alkaloid in aconite, belladonna, hyoseyamus and nuxvomica by gravimetric analysis was successful and the author's figures closely correspond with those given by the former so that it may be said a "good beginning" has been made.

Instead of treating the extract with dilute sulphuric acid, adding ammonia and shaking with chloroform, Kunz exhausted with alcohol, evaporated, then made alkaline and treated with ether and lastly with chloroform. By evaporating the ether and chloroform solutions the alkaloid was obtained and subjected to further purification. By this method he undoubtedly obtained a pure alkaloid; but it must be taken into consideration that he operated with 50 grams of extract. Schweissinger found that the chloroform would not emulsionize so readily with the alkaline solution of the extract, and went a step further in not only determining the alkaloid gravimetrically but also volumetrically. Dieterich followed Schweissinger's method and the alkaloid obtained by evaporating the chloroformic solution corresponded in weight with that found by Schweissinger, but did not correspond with the figures obtained by titration as the following table shows:

EXTRACT OF BELLADONNA.

	<i>By Weight</i>	<i>By Titration.</i>
1.	1.060 per cent. alkaloid.	0.070 per cent. alkaloid.
2.	1.020 " "	0.116 " "
3.	1.320 " "	0.335 " "
4.	1.480 " "	0.138 " "
5.	1.445 " "	0.046 " "
6.	1.313 " "	0.470 " "

EXTRACT OF HYOSCYAMUS.

7.	0.572 per cent. alkaloid.	0.058 per cent. alkaloid.
8.	0.710 " "	0.116 " "

It is evident that by titration a smaller quantity is obtained than by weighing, but the difference is so great that it cannot be attributed to impurity of the alkaloid. 0.04 gram of pure atropine required 13.6 cc. of 100th normal acid, which is equal to 0.0393 atropine.

A strong penetrating odor and white fumes were noticed coming from the chloroform solution whilst evaporating on a water-bath, and recalling the fact that chloroform vapor at a red heat is decomposed yielding carbon, chlorine and hydrogen chloride, decomposition was supposed to be due to the flame under the water-bath. Part of the chlorine compound was found in the alkaloidal residue by the following experiments: A piece of moistened blue litmus-paper was placed over the flame whilst the chloroform was being evaporated, and reddening of the paper was soon observed. A small quantity of chloroform was placed alongside of some ammonia in a covered flat glass vessel, and immediately on placing a lighted spirit-lamp under the chloroform white fumes of ammonium chloride were noticed, and in a very short time the ammonia solution after acidulating with nitric acid, gave a strong chlorine reaction with silver nitrate. Undoubtedly a portion of the alkaloid combines with the acid thus liberated and is lost for titration. It is unnecessary to remark that the chloroform was examined before trying these experiments and found to be pure.

It being desirable to control the gravimetric analysis by titration, another solvent—ether—was used with satisfactory results. Slight differences were noticed in the yield of alkaloid, but by repeatedly shaking with ether a larger yield was obtained; it is however doubtful if all the alkaloid can thus be extracted, and as a result of his experiments Dieterich comes to the conclusion that it is impossible to completely exhaust such organic substances by shaking or precipitation. Very satisfactory results were obtained by displacement. To accomplish this the extract was treated with an alkali, the mixture made porous and then exhausted with ether. To liberate the alkaloids lime, baryta and ammonia were used, and for porous substances lime and washed powdered pumice stone. After making sure that the lime (in the form of burnt marble) did not decompose atropine, hyoscyamine, strychnine, brucine, etc., the quantity of water most suitable for the

purpose remained to be ascertained. The extract was dissolved in water and mixed with lime and pumice stone and exhausted by continuous displacement (the apparatus used is described in *Phar. Centralhalle*, 1886, p. 273) with ether, a water-bath supplying the requisite warmth. The ethereal solution was evaporated to about 1 cc., several drops of alcohol and 10 cc. of water were added, and the solution was titrated with 100th normal acid, using rosolic acid as an indicator. The results were as follows:

	<i>Extr. Bellad.</i>	<i>Water.</i>	<i>Lime.</i>	<i>Pumice.</i>	<i>Alkaloid.</i>
9.	1 gm.	1 gm.	2.5 gm.	10 gm.	.665 per cent.
10.	2 "	2 "	5 "	10 "	.838 "
11.	2 "	1 "	5 "	10 "	.925 "
12.	1 "	2 "	5 "	5 "	.982 "
13.	2 "	2 "	5 "	5 "	1.040 "
14.	2 "	2 "	5 "	10 "	1.040 "
15.	2 "	3 "	10 "	5 "	1.128 "
16.	2 "	2 "	10 "	— "	1.069 "
17.	2 "	3 "	10 "	— "	1.180 "

The largest yield was obtained with a large excess of lime (No. 17). Less favorable were the following experiments:

- 18.) 2 Ext. Bellad., 2 Ammonia, 15 Pumice; 1.156 per cent. alkaloid
- 19.) 2 Ext. Bellad., 2 Water, 1 Baryta, 15 Pumice; 1.127 per cent. alkaloid.

Ammonia takes up a great deal of coloring matter and renders titration difficult, and the same, but in a less degree, is the case with baryta. Before giving a definite method, experiments were made to determine whether there is any decomposition of the alkaloid, and secondly whether the alkaloid may be completely removed from the extract treated with lime. Accordingly 10.0 grams of extract of belladonna were dissolved in 15.0 grams of water, 50.0 lime added and treated for half an hour with ether. The 100 cc. of alkaloid solution thus obtained was divided into five portions of 20 cc. each, and a few drops of alcohol and water were added in exper. 21, when reduced to about 1 cc.

	20 cc. evaporated	Dried at	Percentage of Alkaloid.	
			Weight.	Titration.
20.	Spontaneously,	40° C.	1.322	1.165
21.	Water-bath,	—	1.315	1.159
22.	"	60° C. for 15 minutes,	1.222	1.045
23.	"	100° C. for 10 "	1.117	0.627
24.	"	100° C. for 15 "	1.110	0.569

Experiments No. 20 and No. 21 can be taken as normal, whilst from No. 22 to No. 24 according to temperature and time used in drying a

considerable discrepancy in the figures attained by titration is noticeable. The question arises if by drying the alkaloid there is a decomposition, or if the dried alkaloid is not so readily affected by the acid. Solutions No. 23 and No. 24 were allowed to stand 1 day and again examined. The solutions were neutral just as on the previous day ; if it were due to difficult solubility they should have reacted alkaline and required the addition of more acid. A decomposition, it must be inferred, takes place. Experiments No. 20 and No. 21 show in weighed (crude) and titrated (pure) alkaloid a ratio of 100 : 88.

25) To determine whether ether is quick or slow to dissolve out the alkaloid, 2.0 extr. of belladonna were dissolved in 3.0 water and mixed with 10.0 lime. The powder was displaced with 5 portions of ether. Each portion was collected and examined separately with the following results :

I.	0.968 per cent.	Total.....	1.169 per cent. of alkaloid.
II.	0.072 "		
III.	0.072 "		
IV.	0.057 "		
V.	traces		

Hence it must be concluded that ether answers for completely extracting the alkaloid.

26) 2 gm. extr. belladonna dissolved in 3.0 water, added 0.040 atropine and 10.0 lime, extracted with ether and carefully evaporated to about 1 cc., added a few drops of alcohol and 10 cc. of water. It required for titration 21.7 cc. 100th normal acid. After deducting 13.6 cc. for the 0.04 atropine added, the remaining 8.1 cc. indicate 1.170 per cent. of alkaloid. The result thus obtained must be considered satisfactory and shows that lime does not decompose the alkaloid.

27) 0.024 grams of atropine dissolved in 3 cc. of water, added 10.0 powdered lime, exhausted with ether, evaporated and dissolved the residue in a few drops of alcohol and 10 cc. of water ; required for neutralization 8.1 cc. 100th normal acid corresponding to 0.0234 atropine. The loss sustained is very small and proves beyond doubt that displacement is preferable to shaking.

So far the experiments were made only with extract of belladonna, and although good results were obtained, it was concluded to examine the extracts of aconite, conium and hyoseyamus, and to use—1stly, the ordinary method with lime ; 2dly, with lime and fractional displacement, and 3dly, the ammonia process. The following shows the yield in alkaloids :

	<i>Extract.</i>	<i>1st Method.</i>	<i>2d Method.</i>	<i>3d Method.</i>
28—30.	Aconite	1·279 per cent.	1·299 per cent.	1·305 per cent.
31—33.	Conium	0·635 “	0·618 “	0·647 “
34—36.	Hyoscyamus	0·837 “	0·837 “	0·803 “

Whilst the extraction of extract of aconite and extract of hyoscyamus is easily accomplished in half an hour, it required from $1\frac{1}{2}$ to 2 hours to completely exhaust the conium extract. The figures obtained prove the efficacy of the new process. The only doubt was in reference to extract of nux vomica, as some text books give the solubility of strychnine in ether to be 1 : 1250, and brucine as insoluble. To ascertain their solubility in ether, 0·1 strychnine and 0·1 brucine were triturated with 3·0 cc. of water and 10·0 of lime. After extracting the powder with ether for one hour the liquid was evaporated and dissolved in a few drops of alcohol and 10 cc. of distilled water; for titration 7·5 cc. 100th normal acid were required, equivalent to 0·1365 alkaloid. In the meantime the extraction was carried on for another hour. The liquid treated as before required for titration 3·1 cc. 100th normal acid equivalent to 0·0564 alkaloid, making the total 0·1929. This experiment proves conclusively that brucine is not insoluble in ether, and it naturally follows that the amorphous alkaloid, as obtained by the action of the alkalies, must be more soluble than the pure alkaloid.

It was necessary to slightly modify the process for extract of nux vomica owing to the large amount of alkaloid it contains. The same quantity of water and only half the quantity of extract, rosolic acid as indicator and 20th normal acid, in place of 100th normal acid, were used; assuming the presence of equal quantities of brucine and strychnine, 1 cc. of 20th normal sulphuric acid is equivalent to 0·0182 gram of alkaloid.

The experiments were made in a similar manner as with extract of belladonna, with the following results:

(38 and 39) 1·0 extract nux vomica, 3·0 water and 10·0 lime yielded 18·92 per cent. and 18·74 per cent. of alkaloid.

(40) 1·0 extract nux vomica, 3·0 water, 10·0 lime were treated three times with cold ether and then displaced, the four fractions yielded 15·10, 2·36, 0·36 and 0·92, or a total of 18·74 per cent. alkaloid.

(41) 1·0 extract nux vomica, 1·0 water, 2·0 ammonia and 15·0 pumice stone, after one hour's extraction 18·38 per cent., after fifteen minutes more 0·18 per cent., total 18·56 per cent. of alkaloid.

(42) 1·0 extract nux vomica, 0·1 strychnine, 0·1 brucine, 3·0 water, 5 drops diluted sulphuric acid, 10·0 lime yield 18·74 per cent. of alkaloid, after deducting the strychnine and brucine added.

Experiments No. 38 to 42 furnish proof that both lime and ammonia answer for the modified process. Whilst titrating it was noticed that toward the end the reactions were not so distinct as with the other extracts, so that very sensitive test-paper had to be employed; furthermore crystals of alkaloid separated out in the ethereal solution and had to be redissolved in alcohol. As in former experiments lime again proved preferable to ammonia as purer alkaloidal solutions are obtained and more readily titrated.

The above results indicate that the method is well adapted for estimating the amount of alkaloid contained in the extract, but it requires very exact work, and, above all, a complete liberation and solution of the alkaloids.

To determine whether the addition of lime, owing to its great affinity for water would prevent the complete exhaustion of the extract, the extract was dissolved in normal ammonia and mixed with lime, so that the alkaloids were liberated by the ammonia, while the lime merely took up moisture and coloring matter, and by uniform incorporation with the extract rendered it fit for extraction. The following experiments show the results obtained:

(43) 20 extract aconite, 2 cc. normal ammonia, 10 gm. powdered lime, yield 1·279 per cent. alkaloid (compare experiments 28, 29, 30).

(44) 2 gm. extract belladonna, 2 cc. normal ammonia, 10 gm. powdered lime yield 1·156 per cent. alkaloid (compare experiments 17, 18, 20, 21, 25).

(45) 2 gm. extract hyoscyamus, 2 cc. normal ammonia, 10 gm. powd. lime, yield 0·766 per cent. alkaloid (compare experiments 34, 35, 36).

(46) 1 gm. extract nux vomica, 2 cc. normal ammonia, 10 gm. powd. lime, yield 18·74 per cent. alkaloid (compare experiments 38 to 42.)

By comparison it will be observed that the same quantities were obtained as before, proving that either ammonia or lime or both may be used. The slight difference in extract of hyoscyamus is due to the fact that a new extract was used, it having been omitted to reserve a portion of the original extract. The process practically consists in, firstly, liberation of the alkaloid; secondly, extraction with ether; thirdly, evaporation of the ethereal solution, and fourthly, titration. Of these, the third requires a great deal of attention.

a) *Examination of extracts of belladonna, aconite, conium and hyoseyamus.* Triturate 0.2 grams of powdered lime, prepared from marble, with 3 gm. of water, add 2 gm. of extract, when dissolved carefully add 10 gm. powdered lime. The mixture is then placed in a closed continuous displacement apparatus, the receiving bottle containing about 30 gm. of ether is suspended over a water-bath (not too hot) and the process of extraction is regulated by bringing the ether bottle nearer or further from the water-bath. With extracts of belladonna, aconite and hyoseyamus extraction is carried on for 30 or 45 minutes at the highest. Conium extract requires at least 2 hours. It is advisable to exhaust a second time with ether. The ethereal solution of the alkaloids is transferred to a tared porcelain capsule, and the receiving bottle rinsed 2 or 3 times with small portions of ether; 1 cc. of distilled water is added, and the ether carefully evaporated over a water-bath at a temperature not exceeding 30° C., care being taken not to work near hydrochloric, nitric, acetic or other volatile acid. The residue weighing 1.5 grams, is dissolved in 0.5 cc. of alcohol, spec. grav. 892, the solution diluted with 10 cc. distilled water and after adding 1 or 2 drops of rosolic acid solution (1 : 100 alcohol) titrated with 100th normal sulphuric acid, each cubic centimeter of which neutralizes 0.00289 gm. atropine or hyoseyamine, 0.00523 gm. aconitine, and 0.00127 conine.

The following results were obtained:

Extract of belladonna, (13 experiments) 1.170, 1.184, 1.163, 1.170, 1.156, 1.142, 1.156, 1.142, 1.156, 1.170, 1.184, 1.170, 1.170 per cent.

Extract of aconite root (6 experiments) 1.305, 1.252, 1.279, 1.252, 1.279, 1.279 per cent.

Extract of hyoseyamus (6 experiments) .780, .766, .766, .751 .751, .766 per cent.

Extract of conium (6 experiments) .609, .597, .622, .622, .597, .589 per cent.

β) *Examination of extract of nux vomica.* 0.2 gm. powdered lime and 1 gm. extract of nux vomica are intimately mixed, 3 cc. of distilled water added and evenly mixed with 10 gm. powdered lime, then exhausted in the same manner as before for 1½ or 1¾ hours. The receiving bottle is rinsed with alcohol twice and then with ether, and after adding 1 cc. of distilled water the percolate is evaporated in a tared porcelain capsule (at the same temperature and with the same

caution as stated above) to 1.5 grams; then add 0.5 cc. alcohol sp. gr. .892, 10 cc. of distilled water and 2 drops of rosolic acid solution and titrate with 1--20th normal sulphuric acid. Toward the end it is advisable to use delicate blue litmus-paper conveying the solution on the paper by means of platinum wire; 1 cc. of 1--20th normal sulphuric acid corresponds to 0.0182 gram of alkaloid.

The method may be modified by triturating 1 gm. extr. nux vomica with 3 cc. normal ammonia and adding 10 gm. powdered lime. The first process yielded the following results of six experiments: 18.74, 18.92, 18.74, 18.56, 18.65 per cent. alkaloid.

GLEANINGS FROM FOREIGN JOURNALS.

BY GEO. H. OCHSE, PH. G.

Test for Thymol.—Thymol dissolved in a pure solution of caustic potassa produces a violet color changing to violet red by agitation on the addition of several drops of chloroform. This reaction takes place only in warm solutions. 0.01 grams thymol shows the coloration quite distinctly.—*Archiv der Pharmacie*, 1887, p. 37.

Salol Mouth wash.—Salol, 1 gm.; alcohol, 100 gm.; tincture of cochineal, 3 to 5 gm.; oil of rose, gtt. 1; oil of peppermint, gtt. 2. Mix. One teaspoonful to a glass of water for mouth-wash.

Liquid Glue.—Sugar 1 part is dissolved in 3 parts of water, to this solution is added one-fourth as much slaked-lime as sugar used and the whole heated to 75°C. The mixture is frequently agitated for several days or until the greater portion of the lime is dissolved. The thick solution is then poured off and is ready for use. If three parts of ground glue are allowed to swell in 13 parts of the sugar solution and then warmed the glue soon liquefies and remains liquid without impairing its adhesiveness. A thicker or thinner consistency is obtained by adding more or less glue to the sugar solution. Concentrated liquid glue remains turbid, thin solutions become clear on standing. The adhesive properties of this liquid glue are excellent.—*Phar. Rundschau* (Prag), Dec. 1886, p. 1021.

Perfumes.—The following formulæ are recommended by Soxhlet:

Eau de Cologne.—Oil of neroli, 5; oil of bergamot, 45; oil of lemon, 20; oil of lavender, 1; oil of rosemary, 1; benzoin, 0.50; deodorized alcohol, 1250.

Court Bouquet.—Oil of bergamot, 10; oil of neroli, 1.50; alcohol

deodorized, 150 ; orris root, 30 ; storax, 0.50 ; musk, 0.20.

Ess. Bouquet.—Ext. jasmin, ext. reseda and ext. violets, of each 50 ; orris root, 30 ; liquid storax, 0.50 ; ambergris, 0.50 ; oil of Curaçoa, 5. This extract is said to be very nearly the same as Bailey & Co's of London.

Lacmoid obtained by Merek by the action of sodium nitrite on resorcin is more sensitive than litmus and might easily supplant phenolphthaleine. As an indicator the following solution is used: Lacmoid, 0.5 gram ; distilled water, 100 cc. ; alcohol, (96 per cent.) 100 cc.—*Phar. Zeit. f. Russl.*, xxv., p. 849.

Chloroform contaminated with arsenic is frequently met with, according to Dr. Scholvien. Ten kilograms of chloroform on examination yielded 0.12 gram of arseniate of ammonium and magnesium. To quickly test chloroform for arsenic he recommends shaking with dilute solution of caustic potassa, evaporating and treating with sulphuretted hydrogen in Marsh's apparatus, or more conveniently according to Bettendorf's method.—*Schweizerische Wochenschrift*, xxv., p. 22.

Hayward's hand fire grenades, according to Gawalovski, consist of the mother-liquor obtained in the manufacture of sea-salt. It is an impure solution of chloride of magnesium and chloride of calcium. Gawalovski's analysis showed the presence of 18.329 per cent. calcium chloride, 5.700 per cent. magnesium chloride, 1.316 per cent. sodium chloride, 2.179 per cent. potassium bromide, 0.265 per cent. barium chloride, 72.211 per cent. water, and traces of iron and aluminium chlorides.—*Chemisch-technische Zeitung*, v., p. 22.

THE EVIDENCE FOR THE EXISTENCE OF ACID MORPHINE MECONATE.¹

By D. B. DOTT, F.R.E.S.

At a former meeting of this Society I contributed a paper² on the Meconates of Morphine, in which I described the normal meconate, and mentioned that an acid salt also probably existed. At that time there was some doubt as to the basicity of meconic acid. It was generally supposed to be tri-basic; that is, the acid was believed to contain in the molecule three atoms of hydrogen each replaceable by an atom of a univalent radical, each of these hydrogens likewise having

¹ Read before the Pharmaceutical Society of Great Britain at an evening meeting in Edinburgh, Wednesday, Feb. 16.

² *Pharm. Journ.*, [3], ix., 883.

the same function. In the case of an organic oxyacid such as meconic this infers the presence of three carboxyl radicals in the molecule. By the researches of Dittmar and Dewar,³ Mennel,⁴ Hilsebein,⁵ and others, it is now established that meconic acid is only dibasic though triatomic. In other words, while it contains three hydroxyl radicals it only contains two carboxyls. Whence it appears that the existence of two morphine meconates is theoretically possible. The normal or neutral meconate has been described as above referred to, and it now remains to consider whether there is sufficient evidence to prove the existence of an acid meconate of morphine.

In the identification of a substance, there is no property of so much importance as crystalline form. If a salt having the composition of acid morphine meconate, and possessing a particular crystalline formation, could be prepared, the evidence for the existence of the acid meconate would be complete. No such salt, however, has been prepared, and we have therefore to rely entirely on less satisfactory and perhaps merely negative evidence.

As it is an almost invariable, if not quite invariable, rule, that the neutral and acid salts of a base differ widely in their solubility in a given menstruum; it seemed likely that light would be thrown on the subject under discussion by the following experiments:—A saturated solution in water of neutral morphine meconate was prepared at the ordinary temperature, and then divided into two portions of 50 cc. introduced into separate flasks. To one (a) 0.2 gram of morphine meconate was added, which after diligent shaking did not perceptibly diminish in bulk, showing the solution to be saturated. 0.3 gram of meconic acid was then added, and the solution well shaken. The salt did not disappear, and even after the lapse of twelve hours, and with frequent agitation, there was no appreciable diminution in the bulk of the salt. To the other flask (b), 0.2 gram of meconic acid was added. On standing several hours with occasional shaking, the acid was slowly dissolved. Now, if acid morphine meconate were more soluble than the normal salt the meconate added to (a) ought to have dissolved; while if less soluble than the normal salt the acid added to (b) should have caused a precipitation. These experiments, therefore,

³ 'Proc. R. S. E.,' 1869, 129.

⁴ *Journ. pr. Chem.*, [2], xxvi., 449.

⁵ *Ibid.*, [2], xxxii., 129.

tend decidedly to prove the non-existence of the acid salt. They are not, however, absolutely conclusive, as the acid salt may exist, and yet be decomposable by water. If from a mixture possibly containing acid meconate with excess of meconic acid, a particular solvent should remove morphine and meconic acid in the proportion to form acid meconate, we would have good ground for believing that salt to exist, though it might be in a very feeble state of combination. Unfortunately we know of no solvent which dissolves meconate and which does not at the same time dissolve meconic acid. That test, therefore, cannot be applied. What reasons, then, have we for assuming that acid morphine meconate has ever been formed? Almost the only basis for this belief is the fact referred to in my former paper that a mixture of morphine and meconic acid in molecular proportions under certain circumstances forms an amorphous hygroscopic mass. We have, therefore, to determine whether this mass possesses any properties which cannot be explained on the hypothesis that it is a mixture of the normal meconate with excess of acid. To elucidate that question, the following experiments were tried:—

(1). Morphine and meconic acid in molecular proportions were dissolved in anhydrous alcohol with the aid of heat. On cooling, an amorphous mass was deposited.

(2). Morphine and meconic acid were used in the same proportions, but with 10 per cent. excess of acid, were similarly dissolved, with the same apparent result, no crystals of meconic acid being visible in the amorphous deposit.

(3). Morphine and meconic acid in proportions to form the neutral salt were dissolved in the same manner. An amorphous mass was likewise deposited.

According to the general law in such cases, this amorphous meconate is extremely soluble, but it quickly combines with its water of hydration and then crystallizes out as neutral 5-hydrate until the solution attains its normal condition of saturation. The above results, considered with those stated in former papers, render it extremely doubtful whether the acid morphine meconate really exists. There is certainly no sufficient evidence that it has ever been prepared. All references therefore, in the British Pharmacopœia or elsewhere, to "morphine bimeconate" ($C_{17}H_{19}NO_3C_7H_4O_7$) must be taken as referring to a purely hypothetical compound, which is not surely known to have a being.—*Phar. Jour. and Trans.*, Feb. 26, 1887, p. 690.

SYNTHESIS OF ACTIVE CONINE.

BY A. LADENBURG.

Further experiments on a larger scale, and with pure materials, have confirmed the author's previous results (AM. JOUR. PHARM. 1886, 344). *α-Allylpyridine* boils at 187·5—192·5°, and is a strongly refracting liquid of sp. gr. 0·9595 at 0°, sparingly soluble in water, and having a distinct conyryne-like odor. The *platinochloride*, $(C_3H_5, C_5H_4N)_2, H_2 PtCl_6$, melts at 185—186°, and crystallizes in needles sparingly soluble in water. The *aurochloride* melts at 135—136°; the mercuriochloride and cadmio-iodide are also described. By the action of sodium on an alcoholic solution at the boiling point, *α-allylpyridine* is reduced almost quantitatively to *α-propylpiperidine*. This base has a sp. gr. 0·8626 at 0°, and boils at 166—167°; its hydrochloride crystallizes in white, silky needles, melting at 203—205°. In smell, solubility, specific gravity, and physiological action, *α-propylpiperidine* resembles conine, and not only are the platinochlorides, aurochlorides and cadmio-iodides similar, but when *α-propylpiperidine* is converted into conyryne by Hofmann's method, a blue fluorescence is obtained just as with conine. This fluorescence is due to an accompanying product, for if the fluorescent base after separation from unaltered conine be converted into the platinochloride, the conyryne regenerated from it is no longer fluorescent. Conyryne platinochloride from conine crystallizes in monoclinic forms: $a : b : c = 1·0614 : 1 : 1·5374$; $\beta = 87^\circ 8'$; and the crystals from the synthetical base give practically the values on measurement.

α-Propylpiperidine, however, in addition to the lower melting point of its hydrochloride, is optically inactive, and must be regarded as a physical isomeride of conine. To effect a separation into two optically active bases, a sterilized nutritive solution containing 0·5 per cent. of the tartrate was seeded with *Penicillium glaucum*, but without result. The active base, however, was obtained by introducing a crystal of the salt into a very concentrated solution of *α-propylpiperidine* hydrogen tartrate; a slow separation of crystals took place, which yielded a dextrorotatory base, whose specific rotation was $[a]_D = 13^\circ 87'$, compared with $[a]_D = 13^\circ 79'$ for conine. The hydrochloride of the synthetical active base melts at 217·5°, that of conine at 217·5—218·5°.

From the mother-liquor, a levorotatory base was obtained, but it contained a large proportion of the dextrorotatory modification, which could not be further separated by the crystallization method. How-

ever, on converting this levorotatory mixture into the cadmio-iodide, it was found that after crystallization, the crystallized salt yielded a base which was less levorotatory than before, whilst from the mother-liquor a base was obtained, which in a 50 per cent. alcoholic solution gave a rotation of $-3^{\circ} 30'$ in a decimetre tube, compared with $3^{\circ} 10'$ for conine under the same conditions.—*Jour. Chem. Soc.*, Feb. 1887, 160; *Berichte D. Ch. Ges.*, 1886, 2578.

BITTER ALOES: A CONFESSION OF BEWILDERMENT.*

BY J. F. BROWN.

Almost the first step in an alphabetical progress through *materia medica* brings the student face to face with the numerous contradictions which cluster round the subject of this paper, making it appear almost an insoluble conundrum.

You will be relieved to hear that I shall pass by all questions of botanical origin or of chemical formulæ, and consider only those others which have been suggested by a collation of the statements *ad rem* published in the *Pharmaceutical Journal* at different times, and contained in a few standard authorities. All these agree that the drug is the inspissated juice which has exuded or been pressed from superficial vessels in the leaf, and that the different varieties fall naturally into two classes, of which Socotrine and Barbadoes are convenient types.

With the single but weighty exception of the late Peter Squire, all represent the first class as usually prepared by solar heat, the second by artificial evaporation. There is a consensus of opinion on the solitary point that the latter process is injurious to the quality of the drug, which is, however, unsupported by facts. On almost every other point there is an amusing see-saw of learned evidence, worthy of the famous trial at law of the simple question—what is coal?

Thompson ascribes the superiority of Socotrine aloes to the greater proportion of extractive contained therein. Squire gives the proportions of extract as 75 per cent. and 50 per cent. for Barbadoes and Socotrine respectively.

Squibb ascribes the more drastic nature of Barbadoes to its having

*Read before the Dover Chemists' Association. Reprinted from *Phar. Jour. and Trans.*, Feb. 19, 1887, p. 678.

been prepared by boiling; but it is questionable whether the two classes differ essentially in their operation, or merely in degree, needing only readjustment of doses to overcome it. A more important question, indeed the cardinal point in discussing the therapeutics of aloes, is, whether aloin is the true active principle or measure of value of the drug. In spite of the boiling, it is the Barbadoes variety which has generally been used as the source of this principle. Tilden, however, regards Barbaloin, Socaloin and Nataloin as unmistakably different substances. In the hands of Plenge, Tilden's process gave yields of 3 per cent. from Socotrine and 9 per cent. from Barbadoes respectively. An alternative process, in which Socotrine was treated by boiling in alcohol for two hours, gave 10 per cent. of aloin; but it is difficult to reconcile this method of separation with Squibb's statement that, with the exception of about 6 or 7 per cent. of impurities, the whole of the drug is soluble in alcohol.

Tilden considers that all varieties owe their bitterness to the aloin they contain, and he obtained 20 per cent. from Barbadoes by treating it as for extract, evaporating the liquid resulting from 1 lb. of aloes to 32 fluidounces, which must consequently have been a 10 per cent. solution of aloin.

Craig states that aloin constitutes 25 per cent. of aloes, yet Mitchell obtained only between 8 and 9 per cent. from Barbadoes, and oddly enough, states that the residual liquid from 1 lb. yielded 10 oz. of "very good" extract.

It appears then that the boiling, which is so strongly deprecated both in obtaining the crude drug and in making its galenical preparations, is consistent with a larger yield of aloin and greater purgative power in the aloes so prepared.

Most curious is it also to note that while the sun-dried Socotrine is generally regarded as the standard quality and described by Tilden and Rammell as consisting mainly of crystallized aloin with some resinoid, the authentic specimen procured by Professor Balfour, when examined by Dott, yielded only 2 per cent. of the former to 55 per cent. of the latter, and was regarded as more historically interesting than medicinally valuable.

If the reason for this be sought for in the fact that it had been kept for three years, we are confronted by the statement of Tilden that aloin is not easily decomposed by heat in neutral or slightly acid solution, which latter condition is stated by Branson to

be natural both to the juice of the leaf, and an aqueous solution of the drug; also by the well-known practice of storing a certain variety of aloes, whereby it is believed greatly to improve. Prolonged exposure to moist heat is said by Tilden to convert aloin into a brown substance, called by Craig "changed" aloin, and stated by him to retain its therapeutic activity, since numerous experiments on human beings and rabbits showed that 1 or 2 grains acted as a mild aperient. So that Aitken's complaint of the injury done to the extract by the employment of steam heat in its preparation seems hardly well founded.

Royle and Headland state that aloin heated to 212° F. is rapidly oxidized and decomposed, but Tilden considers the presence of alkali essential to rapid oxidation, and notes that potassium carbonate is specially conducive to this change.

In Paris's "Pharmacologia" it is held that the purgative property of an alkaline solution diminishes, *pari passu*, with the bitterness; Branson remarks that the decoction becomes less purgative by keeping, and Tilden states that the oxidized and tasteless alkaline solution has no effect, but W. Young found that the varying degrees of bitterness did not affect its aperient activity. My own very limited experience leads to a doubt whether a sample of concentrated decoction, which from keeping has ceased to be unbearably nasty, is therefore necessarily inefficient.

Cathartic remedies excel most others in the completeness with which their action is demonstrated; that such clouds of doubt, therefore, obscure the truth with regard to one of the best known of this class lessens our wonder at the virtues alternately affirmed and denied to belong to those whose working is less palpable.

The uncertainty as to the dose of aloin will illustrate my meaning. T. and H. Smith state the relative proportion as 1 to 5 of aloes; but Tilden took $\frac{1}{2}$ to 1 grain without effect, although it does not appear that he controlled the test by taking 5 grains of aloes. Dr. Craig gives the dose as $\frac{1}{2}$ to 1 grain, the B.P. $\frac{1}{2}$ to 2 grains, Squire 1 to 2 grains, Mitchell 1 to 3 grains, and Martindale 1 to 4 grains. Stillé and Maisch regard aloin as probably two or three times as active as good aloes, and quote Dr. Harley to the effect that $1\frac{1}{2}$ grains will produce two or three copious evacuations in a strong adult, and that $2\frac{1}{2}$ grains are a powerfully cathartic dose.

This is rebutted by Dobson and Tilden's published record of fifty cases, principally adult males, in which all three kinds were given in doses not exceeding 2 grains, with effect described as "slight and very uncertain."

Barbaloin, especially with soap, appeared slightly the strongest of the three, but nataloin in 6-grain doses failed to act in some, in other cases acted freely in smaller dose. The authors conclude that aloin acts as well as an equal dose of aloes and gripes less. By A. P. Brown aloin is considered not more active than an equal dose of aloes, and the resin inert, while Proctor's personal experience is that aloes, aloin, uncrystallizable extract and insoluble portion all acted equally well.

That the solubility of aloin in water should be variously stated as 1 in 60, 1 in 90, and 1 in 500, and as insoluble—freely soluble—soluble 1 in 30 of alcohol—is only part of the puzzle.

It is agreed that the resin is very uncertain when used hypodermically, but Tilden and Craig take diametrically opposite views as to whether it is "changed" (possibly dehydrated) aloin, or something essentially different. The latter gave 8 grains with good effect, but 12 grains of a sample specially prepared free from aloin by Messrs. Smith failed to operate. Craig's own process consisted in dissolving well-washed resin in spirit, and precipitating by the addition of boiling water. Fifteen per cent. of the product was insoluble in spirit, and gave 23 per cent. of ash. It is known that the insoluble part of aloes is to some extent rendered soluble by prolonged contact with hot water, but this experiment points to such treatment rendering that insoluble in alcohol which had previously dissolved.

The successful hypodermic administration of aloin seems to render needless the elaborate building up of those composite pill structures, with casings of various degrees of solubility, which were recently recommended.

Would it be too much to ask some competent student of therapeutics, if the ever-rising flood of novelties will permit, to try and throw some light upon the action of this old and familiar drug. My own diffident guess is that when submitted to the process of digestion, and especially to the eminently solvent properties of the bile, the whole of the drug, save only the desert sand and comminuted monkey skin casually and occasionally accompanying it, is capable of producing its well-known benign effect.

NON-ACID CONSTITUENTS OF BEESWAX.

BY F. SCHWALB.

Repeated boiling with alcohol extracts about 5 per cent. of cerotic acid from beeswax. The residue is saponified with alcoholic soda, and after the alcohol has been removed by distillation and by boiling with water, the soap is separated by the addition of common salt. To remove any free alkali, the soap is pressed in a cloth, redissolved in hot water, and again salted out. This operation is repeated several times. The soap is thoroughly dried at 110—120°, and the non-acid constituents are separated by fractional solution in, and recrystallization from, light petroleum. The most soluble portion of the extract, melting between 55° and 65°, contains two hydrocarbons; one melting at 60·5° appears to be identical with Krafft's normal heptacosane, $C_{27}H_{56}$ (1882), and the other which melts at 67°, is probably identical with normal hentriacontane, $C_{31}H_{64}$. It is probable that other hydrocarbons are also contained in the wax.

The myricyl alcohol is less soluble in light petroleum than the hydrocarbons. It appears to have the formula $C_{31}H_{64}O$, and is not identical with the alcohol $C_{30}H_{62}O$, contained in carnauba wax. It melts at 85—85·5°, and resolidifies at 84°. When heated with soda lime, it is converted into the salt of an acid, $C_{31}H_{62}O_2$. This acid is sparingly soluble in the usual solvents at the ordinary temperature, but it dissolves in hot light petroleum, and is deposited from the solution in white needle-shaped crystals, which melt at 88·5—89°. The lead salt melts at 115—116°, and dissolves freely in acetic acid and in boiling toluene. The silver salt is amorphous. It melts at 180°, with decomposition. The copper and magnesium salts are also amorphous. They dissolve in boiling benzene. The methyl and ethyl salts crystallize in needles. They dissolve freely in warm ether and warm alcohol. The methyl salt melts at 71—71·5°, and the ethyl salt at 69·5—70°. Heated under the ordinary atmospheric pressure, the ethyl salt decomposes before boiling into ethylene and the free acid.

Beeswax also contains two lower alcohols, namely, ceryl alcohol, $C_{26}H_{54}O$ or $C_{27}H_{56}O$, and an alcohol of the formula, $C_{24}H_{50}O$ or $C_{25}H_{52}O$.—*Jour. Chem. Soc.*, Feb., 1887, 124; *Annalen*, vol. 235, p. 106.

ABSORPTION THROUGH THE SKIN.

Ritter and Pfeiffer have repeated the experiments which have been made on this much-disputed topic, and their results serve to strengthen the doubts which others have before expressed as to the capability of the skin to absorb the substances which have been long used, probably following up a false analogy with the effects of mercurial inunctions, with the intention of producing their constitutional effects by their transmission through the skin into the general blood-current. The method which they employed consisted in rubbing well into the extensor surface of a perfectly healthy arm or leg about half an ounce of a salve containing the substance under investigation, and then keeping the skin firmly covered for 24 hours with a protective bandage, so as to prevent any possible absorption by the lungs. The urine was collected for 24 hours and examined, both with and without previous concentration, for the presence of the drug. By these means it was found that a 10 per cent. iodide of potassium salve transmitted the salt through the skin only once in five different cases, and then only after being used for four days; that is, in other words, only after the skin had been irritated and its continuity destroyed by the prolonged action of the fatty acids derived from the decomposition of the lard.

Salicylate of soda applied in the same way never showed the slightest trace of its presence in the urine.

Salicylic acid, on the contrary, invariably gave its characteristic color test with ferric chloride within a few hours after its application. This is easily explained by its well-known action in softening the epidermis and rendering it permeable. If iodide of potassium be applied to a spot which has been previously treated with salicylic acid, it quickly passes into the organism and becomes detectable in the urine.

In a series of parallel experiments made with the view of testing the reputed power of Liebreich's lanolin in assisting bodies incorporated with it to penetrate the skin, the authors were unable (in common with the majority of other experimenters) to perceive that it possessed such power in the slightest degree. [Its physical properties are, however, undoubtedly useful as a salve base.]

Ritter repeated also the experiments which he had previously carried out in order to test the capability of the skin to absorb substances which were sprayed on to it in watery solution. Röhrig, and later Juhl, had asserted this apparently paradoxical action really occurred.

Ritter, however, after carefully excluding all possibility of any entrance of the fluids into the system through the mouth or respiratory passages, was utterly unable to find in the urine the slightest trace of the salicylate of soda or iodide of potassium with which he experimented, and therefore confirms the result of former experiments of his, that the normal skin is not permeable to substances in spray-solutions.—*Med. Chronicle*, Febr., 1887; *Berlin. Klin. Wochenschrift*.

METHYLAL.*

BY B. W. RICHARDSON, M. D., F. R. S.

At a meeting of the British Association for the Advancement of Science, held at Norwich, in 1868, I brought out for the first time the chemical fluid called *Methylal* as an anæsthetic and hypnotic, and at a meeting of the same Association at Exeter, in 1869, I again drew attention to it in order to make it useful in practice.†

Methylal is a colorless fluid of specific gravity 0.855; its vapor density is 38°, taking hydrogen as unity; and boiling-point of 42° Cent., 107.6° Fahr. Its solubility in blood is one part in three; its composition is $C_3H_8O_2$. It is made by distilling methylic alcohol with sulphuric acid in the presence of peroxide of manganese, but it requires several re-distillations before it can be obtained in the pure state, for which reason it is at present a very expensive compound. The first specimens with which I experimented were made in my own laboratory; later specimens have been made for me, with much care, by my friend Mr. Williams, the well-known operative chemist.

When methylal is quite pure it is almost tasteless, but bites the tongue, and owing to its low boiling-point quickly evaporates. The odor of it is fragrant, and not very powerful. The pure vapor creates no irritation on being breathed.

After long exposure to the vapor of methylal, in an atmosphere containing not less than 35 per cent. of the vapor, warm-blooded animals may be made to pass into a sleep which, once established, is deep and prolonged. In my first researches the sleep so induced lasted for intervals of two and even three hours, but I believe now that this long narcotism was due to the presence of acetone, from the methylal not

*From the *Asclepiad* No. 13. Reprinted from *Phar. Jour. and Trans.*, Feb. 13, 1887.

† 'Reports of the British Association for the Advancement of Science.' vol xxviii., pp. 183-4, Norwich meeting; and vol. xxix. p. 406, Exeter meeting.

having been sufficiently purified. Last year with a perfectly pure specimen, made by Mr. Williams especially for my work, I endeavored to anæsthetize two dogs with methylal in order to enable Mr. Mavor, the veterinary surgeon, to operate upon them painlessly. After half an hour's inhalation of the vapor narcotism was not produced. The fluid was then injected hypodermically in one animal to the extent of an ounce dose, upon which a gentle sleep, or rather intoxication, followed, but with no sufficient anæsthesia to allow of painless operating.

In my report of 1869 I showed that methylal, which is very soluble in water, could be administered by the mouth when diluted with water, or by hypodermic injection, and I have prescribed it occasionally, as a mixture several times. I usually begin with a fluid drachm dose, mixed either with glycerin or syrup of orange flowers and distilled water. Example :—

Methylal, pure.....	3vj.
Syrup of orange flowers.....	3iv.
Distilled water.....	3vj.

Mix. To make a solution of 6 ounces ; of which let 1 to 2 fluid ounces be taken in a wine-glassful of water as directed. The dose may gradually be increased to twice the above quantity or more.

In action, as a medicine, methylal lies between alcohol and anhydrous ether. It quickens the action of the heart with reduction of arterial pressure ; it makes the respiration slow and deep ; it induces a tendency to sleep ; and, it is a sedative to pain, but not to a very deep degree. On the whole it would be best to keep it in the group of anodyne antispasmodics, in which I originally put it. It causes very little muscular excitement and no vomiting, but after long inhalation of its vapor it produces a free flow of saliva. As it mixes well with alcohol and with ether it might be administered with either of these agents ; and it might also be given with amyl nitrite for the relief of colic, asthma, angina pectoris or tetanus ; but before it can come into general use it must be reduced in price.

Signor Personali, who has recently been experimenting with methylal, (see AM. JOUR. PHAR., January, 1887, p. 19) seems to have arrived at results similar to my own ; but he adds that it may be used as an ointment or liniment for external application. It is true that it mixes fairly with oil and with lard ; but as it boils at 107° Fahr. I cannot see how it can be of any service for external use, except in causing a slight local anæsthesia by cold, from evaporation.

DETECTION OF ARTIFICIALLY COLORED RED WINE
(CLARET).

By J. HERZ.

To 30—50 cc. of the wine, or if the quantity of coloring matter in the wine is small, 100 cc. concentrated to 30 cc., 20—30 cc. of a saturated solution of magnesium sulphate, and 10—20 cc. of soda solution are added, stirring well; if necessary the treatment is repeated until the liquid is colorless, or nearly so. The filtrate is made acid with dilute sulphuric acid (1:3), and if sulphonic acid colors are present the red color reappears. The most commonly used member of this group, *acid-magenta* (rosanilinesulphonic acid), yields a violet-red solution, and can be estimated by comparing the tint with magenta solutions of known strength. One mgm. of magenta per litre can be distinctly detected in 30 cc. of wine without previous concentration. When *archil* (*orseille*) colors are present, the filtrate is bluish, and when made acid turns a litmus-red color. To test for magenta under such circumstances, Blarez' method of shaking with lead dioxide is used; this destroys the orseille and natural color. Cazeneuve's method is not recommended. To test for other colors in the magnesium hydroxide precipitate, the gelatinous mass is stirred up with hot water, allowed to settle, and the liquid decanted off. If only the natural color of the wine is present, or *bilberry* has been used, this liquid is yellow-brown; if *archil* has been used, dark-violet; if *ponceau*, onion or ponceau red; if *cassissine*, pale-red or dark-yellow; if *vinicoline bordelaise*, a yellow-red to yellow-brown liquid, which when poured on sulphuric acid gives a violet ring. By shaking the colored liquid with amyl alcohol, *ponceau* yields an onion-red residue; *vinicoline*, a dark-brown one; *cassissine*, a dirty-green, violet at the edge, turned yellow by strong hydrochloric acid. The precipitate is a dark-grey or brownish-grey color when the natural or vegetable colors only are present; with *archil*, it is violet; with *magenta* (acid or ordinary), dirty white; with *cassissine*, dirty yellow-brown; with *vinicoline*, crimson-red. The precipitate is mixed with sand, dried, and extracted with ether; the extract contains any ordinary magenta which can be identified in the usual manner by dyeing wool, or *cassissine* which dyes wool red-brown and leaves a yellow-brown residue in the dish. The dyed wool becomes yellow when treated with strong hydrochloric acid and colorless with ammonia. When wine is shaken with amyl alcohol, and the colored extract evaporated, the

residue, if it contains the substances named, behaves in the manner described below :—

		With concentrated		
		H ₂ SO ₄ .	HCl.	NaHO.
Archil	violet-red	blue	red	blue
Bordeaux, B.....	carmine	carmine	carmine	carmine
Ponceau, RRR....	dark-red	crimson	crimson	brown
Cassissine.....	violet-purple	yellow	yellow-brown	red
Vinicoline Bor- delaise.....	cherry-red	brown	red	brown

whilst the wine after extraction is cherry-red with ordinary *magenta*, violet-red with *acid-magenta*, dark-cherry with *Bordeaux*, yellow-red with *ponceau*. Wine colored with *magenta* produces a violet froth. The detection of vegetable coloring matters in presence of the natural color of wine or otherwise is a matter of great difficulty, and most of the known methods are ineffectual; it is, however, effected by the author with comparative facility in the following manner:—10 to 15 cc. of wine is shaken with 5 cc. of a saturated solution of tartar emetic, and then examined by reflected and transmitted light either at once or, if no immediate change has taken place, after some time. This treatment produces with genuine red wine always a cherry-red color, and with other substances as follows:—*Red-poppy* (*Papaver Rhæas*), dark cherry-red; *cherry*, violet; commercial *elder* coloring matter, red-violet; *bilberry* (*Vaccinium Myrtillus*), blue-violet; *privet-berry*, pure violet. White wines artificially colored, and red wines mixed with artificial colors have been successfully examined in this manner; in the latter case the wine some time after treatment is compared with a genuine red wine to distinguish more readily the change of color. Old solutions of privet do not give the color change. Sodium hydrogen carbonate produces with pure *elderberry*, grey-violet; and with *bilberry*, brown-green. Tartar emetic appears to form an antimony lake with the coloring matters. With practice, all the above-mentioned colors can be detected in 30—50 cc. of wine. In the subsequent communication the author acknowledges the priority of Ambühl and Elsner's recommendation of the use of tartar emetic for the purpose in question. They, however, recommend hot solutions; the author finds cold better. Fermented bilberries give the violet color even better than unfermented berries, especially when fresh, inasmuch as oxidation interferes with the delicacy after a time. The distinctness of this color is increased by diluting the wine.—*Jour. Chem. Soc.*, Jan., 1887, p. 91; *Chem. Ztg.* x. 968, 998.

MINUTE OF THE COLLEGE MEETING.

The annual meeting of the Philadelphia College of Pharmacy was held March 28, 1887. The President in the chair. Twenty-two members present. The minute of the last stated meeting was read and adopted. The minutes of the Board of Trustees for the meetings of January, February and March were presented, and on motion approved. At this meeting of the College the usual reports of standing committees, and of other business matters are presented. The editor's annual statement is condensed as follows: "During the year just closed, fifteen papers were read at the various meetings fourteen of these were published in the Journal—this is an increase in such original contributions over the corresponding previous period. In addition to the editor's personal labors, only six members of the College contributed papers, but acknowledgement is due to many writers who contribute though not members. The total number of authors is seventy-four, included in which computation are abstracts from forty theses of the graduating class of 1886. The gleanings from foreign periodicals have mostly been compiled by Mr. Geo. H. Ochse, Ph G., to whom readers have been indebted in former years. These compilations have been amplified by practical notes collected from various sources.

The Committee on Publication offered the following report: "The Publication Committee have the honor to report that the Journal of the College has been issued with its usual regularity and promptness during the year just closed. As an exponent and record of the progress of pharmacy, we think it well attains the object for which it was established and deserves the patronage of every pharmacist who desires to keep abreast with the progress of pharmacy and allied sciences.

The editor's report accompanying this will give in detail the literary work, and the treasurer's report, the financial."

Very respectfully,

HENRY N. RITTENHOUSE,

Chairman Public. Committee.

The Treasurer of the Publication Committee presented the statistical, and also the financial statement of the Business Editor, as well as a report of the Treasurer of the Committee which latter was on motion, directed to be entered upon the minutes. This report gives as is usual the business condition of this department of the College. The account of the Treasurer of the Committee had been vouched and audited. In order to adjust the account, and furnish the committee with the necessary working capital, orders for requisite amounts were on motion ordered to be drawn on the Treasurer of the College, and on the Treasurer of the Publication Committee respectively.

The Librarian presented his annual statement which is condensed as follows: After enumerating the additions to the library, and giving the character of the various works received during the year, he gives also a financial account of his current expenses which being balanced leaves a small amount in his hands.

The Curator also presented his report, which may be summarized as follows: Allusion is made to the good order and condition of the museum and contents, the receipt of numbers of rare and new drugs is acknowledged, reference is made to the importance of this adjunct of the college as a material aid to the educational system, and it is urged that the collection should contain well-made specimens of galenical preparations. Attention is called to a new method of indexing being perfected which when completed will facilitate accessibility to the objects.

The resignation of William Weber from membership in the college was read, and on motion accepted.

The following gentlemen were elected by *viva voce* vote delegates to represent this College at the coming sessions of the Pennsylvania Pharmaceutical Association: Chas. A. Heinitch, Alonzo Robbins and Robert England.

On motion the President appointed Messrs. Jenks, Maisch, Trimble, Remington and Wiegand as a committee to receive and welcome the members of the Pennsylvania Pharmaceutical Association, on the occasion of the annual meeting in June next.

This being the recurrence of the annual election the President ordered a ballot with the following result:

For President, Chas. Bullock; 1st Vice President, Robert Shoemaker; 2nd Vice President, W. J. Jenks; Treasurer, S. S. Bunting; Corresponding Secretary, Dr. A. W. Miller; Recording Secretary, W. B. Thompson; Editor, J. M. Maisch; Librarian, Thos. S. Wiegand; Curator, Jos. W. England; Publication Committee, Chas. Bullock, H. N. Rittenhouse, T. S. Wiegand, James T. Shinn, John M. Maisch, Editor; Trustees for 3 years, T. Morris Perot, J. T. Shinn, J. P. Remington.

WILLIAM B. THOMPSON,
Secretary.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, March 22d, 1887.

The sixth pharmaceutical meeting of the present series was held this day, Wm. J. Jenks being asked to preside.

The minutes of the last meeting were read, and as no corrections were required they were approved.

Professor Maisch presented a petrification, *Dictyophyton tuberosum*, sent by Mr. Luin B. Switzer of the last junior class, and obtained in the neighborhood of Bath, N. Y. It was directed to be placed in the cabinet of the museum.

Mr. Joseph W. England read a paper upon *antiseptic cottons and gauzes*, giving a concise history of their origin and use, which was referred to the Publication Committee; numerous specimens of the products obtained by the described processes were exhibited. In reply to a question, Mr. England stated that at the Philadelphia Hospital the unmedicated absorbent cotton was purchased from manufacturers. Prof. Maisch stated that some 7 or 8

years ago there was nothing published in relation to the preparation of absorbent cotton, and that having tried several simple solvents for removing the oil from the cotton without success, he induced Mr. F. L. Slocum to experiment in this direction, who fully succeeded by repeatedly boiling with a weak solution of caustic alkali, and whose results were then published in the *AMERICAN JOURNAL OF PHARMACY* (1881, page 53). The commercial absorbent cotton, and also the medicated cotton, was stated to be always of handsome appearance, and its unentangled condition was probably due to carding.

Mr. Hance said that the preparation of absorbent cotton was not at all difficult if caustic soda solution, not too strong, was used; this was afterward washed away and the cotton treated with chlorinated lime to bleach it, after which it was dried and carded; but medicated cottons containing remedial agents either in pulverulent or finely crystallized form, particularly if these were present in considerable amount, would be rendered almost valueless by carding as the remedy would be dusted out. In such cases the addition of glycerin is deemed advisable, or even necessary, to keep the cotton moist.

Mr. Procter called attention to a plan which he had put in use for facilitating the correct recording of necessary data upon prescriptions which are left to be sent, or are to be called for after a lapse of some time; it consists in stamping with a rubber stamp upon the prescription, name, address, price, receiver, dispenser, and such other particulars as may be deemed necessary, the blanks being properly filled out in writing. Similar memoranda are stamped and written upon the wrapper. This plan had been found very convenient and saving in time in the asking and answering of questions, and in the proper attention to the requests of customers. The same stamp may likewise be used for articles other than prescribed medicines, if not delivered immediately.

Mr. Walling spoke of *chrysophanic acid* as having been prescribed with the express statement that *chrysarobin* was not intended; he wished to know if there was any *chrysophanic acid* to be obtained in a commercial way that differed from *chrysarobin*. To this query Professor Maisch replied that the name of *chrysophanic acid* was introduced in medical practice through the investigations of Goa powder by Prof. Attfield, who regarded the crystalline principle obtained with hot benzol as being mainly *chrysophanic acid*, but proposed to name it *chrysarobin*. Two German chemists, Liebermann and Seidler, had subsequently examined it, and found it to be a new compound for which the very appropriate name *chysarobin* was retained, and which was readily converted into *chrysophanic acid*, identical with that obtainable from rhubarb as a decomposition product of the glucoside *chrysophan*. He thought that what was commonly sold as *chrysophanic acid* was merely *chrysarobin*. In answer to a question, Mr. J. W. England stated that at the Philadelphia Hospital *chrysophanic acid* was often prescribed in skin diseases, and it was suggested that he examine the article in use and report on it at the next meeting.

Mr. Jenks said that his experience was that *chrysophanic acid* was the commercial term always used, and that he had no doubt that the product was *chrysarobin*.

Professor Maisch said such uncertainty came from the difficulty of inducing men who had become accustomed to a term, to change it to a more appropriate one and thus to correct their habit; this he said was illustrated by the confusion which for a long time existed in the chemical literature of the alkaloids of cinchona bark. Forty years ago Winckler, a German chemist, had isolated an alkaloid which he named *quinidine*, but which was shown by Pasteur to have the same ultimate composition as cinchonine and was named *cinchonidine* which nomenclature was generally adopted by French, English and American chemists, but not by many other chemists until about ten years ago, since which time the literature on cinchonidine and quinidine was not as confusing as during the preceding thirty years.

Mr. England gave an account of the treatment of consumptive patients at the Philadelphia Hospital by enemata of *carbonic acid gas*, which is prepared by decomposing either calcic or sodic carbonate with sulphuric acid, washing it through a solution of 5 grains each of calcium sulphide and sodic chloride in a pint and a-half of water, and collecting the gas in flat rubber bags; the injection is directed twice daily. The results are so striking as to demand notice. The most emaciated patients have been greatly improved, appetite and strength seems to return and the patients have steadily improved. Mr. Robt. England stated that large doses of *tannin* had been given in the same disease and with good results.

The *pharmacy law*, which is now before the Legislature of Pennsylvania was discussed in some of its features. While prescribing in diseases was considered to be out of the province of the pharmacist, it was stated by several of those present, that the pharmacist would always be obliged to furnish simple remedies upon the application of customers.

There being no further business on motion adjourned.

THOS. S. WIEGAND,
Registrar.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS

Philadelphia College of Pharmacy.—The preliminary examinations of the Junior Class were held in November and December last, and passed off satisfactorily. The following questions embrace those of the two preliminary and of the final junior examination, which latter took place on February 19th.

BOTANY AND MATERIA MEDICA.

1.—Explain the nature of a *living cell*, and of its *contents*. Name some of the *cell markings*, and state how they are produced.

2.—Explain the nature of *closed* and of *open fibrovascular bundles*. In what plants or class of plants is each kind found, and in what manner is each kind arranged in the stems of these plants?

3.—Explain *a) the growth of leaves, b) their anatomical structure, and c) the different forms of venation.*

4.—Give a brief history of the *development of stamens*, define their *position* in the flower, and name for each variety of position some officinal flowers or herbs.

5.—Give the botanical name, the habitat, the shape of the leaves, the color of the flowers, and the medical properties of each of the following officinal herbs: *Thoroughwort*, *Grindelia*, *Tansy* and *Wormwood*.

6.—Give the botanical characters of the natural order of Rosaceæ. In what respects do its three principal *Suborders* differ? Mention some drugs or useful plants from each of these *Suborders*.

THEORY AND PRACTICE OF PHARMACY.

1.—Define *specific gravity* and *specific volume*, and give the specific gravity and specific volume of the *officinal liquid* which weighs 647 grains to the fluidounce, water weighing 455.7 grains at the same temperature. Show all of the figures used in making the calculation.

2.—Define *evaporation*, *distillation* and *sublimation*.

3.—Describe a *method of filtering* through paper substances which are solid or semi-solid at ordinary temperatures and which require the constant application of heat to retain them in a liquid condition; illustrate the subject with a drawing.

4.—Describe the *process of decantation* and illustrate its effectiveness by an example showing the production of an insoluble salt by the mixture of two simple solutions.

5.—Give the process for making *Acidum Nitrohydrochloricum*, U.S.P. What are its properties and uses? What compound is produced during the process, and what precautions are necessary in dispensing the Acid?

6.—How would you prepare by an officinal process, an antidote to poisoning with Arsenic? Describe its mode of action upon this poison.

CHEMISTRY.

1.—What is the use of the *Barometer*? Explain the principle upon which it is based. Why is *mercury* used rather than water in the ordinary barometer?

2.—What is the action of a *glass prism* upon a ray of *white light* passing through it? Enumerate the simple colors of the *Spectrum*. What is the *Spectroscope*, and what is it used for?

3.—How are *binary molecules* named? Give an example. Define an *acid*, a *base*, and a *salt*. Are *haloid salts* binary or ternary molecules?

4.—Write out the reactions for making *chlorine* by the two methods generally used. For *what element* has chlorine an especial affinity? Give illustrations. What are the *pharmaceutical* and *practical uses* of chlorine?

5.—What is the difference between an Acid Sulphite and a Neutral Sulphite? Illustrate by giving the formula of an officinal Salt of each class. How do Thio-Sulphates differ in formula from Sulphates and Sulphites? Illustrate by example, using officinal Salts.

6.—Name the officinal varieties of Carbon. State the source of each and mention the points in which they differ. State the pharmaceutical and technical uses for each of these varieties.

QUESTIONS BY THE COMMITTEE.

1.—Name and describe five implements or appliances in common use at the prescription counter. Give a short description, and an explanation of the use of each.

2.—Describe the occurrence of Sulphur in nature. In what forms is Sulphur found in the shops? Give the official names of these several varieties. To what impurities are these liable?

3.—Give a typical formula for an official fluid extract. State why the process of evaporating the weak percolate to a soft extract is preferred to the former method of adding the evaporated liquid to the reserved portion.

4.—How does the descending axis of Monocotyledonous and Dicotyledonous plants usually differ in structure and development? Briefly describe the chief distinctive characteristics of the ascending axis, and leaves of the Monocotyledons and Dicotyledons.

SPECIMENS.

Santonica.	Aqua Anisi.	Acidum Sulphurosum.
Lobelia.	Liquor Ferri chloridi.	Potassii chloras.
Lavandula.	Spirit. Ether. nitrosi.	Magnesi sulphas.
	Syrupus Zingiberis.	

In *Operative Pharmacy* the students were required to prepare Syrupus Ferri iodidi and Unguentum Hydrargyri nitratis.

The re-examination of those junior students who failed in the February examination in one or more branches will be held on Friday afternoon, September 30th, at 3 o'clock.

The examination of the senior students took place from Saturday afternoon, February 26th, until Thursday, March 3, operative pharmacy and chemical analysis being the subjects reserved for the last day.

MATERIA MEDICA AND BOTANY.

A.—*Senega root*.—Give the botanical name, the natural order, and the habitat of the plant. Describe the drug, explain its structural characteristics, and state how it may be distinguished from *false Senega*, sometimes seen in the market. Name the principal constituents of the drug and give the percentage of the acrid principle. What are the medical properties of *Senega*, and in what doses is it given?

B.—*Jalap*.—Give the botanical name, the natural order, and the habitat of the plant. Describe the drug and explain its structure. What percentage of resin should it contain? State the behavior of this resin to simple solvents, and to chemical solvents. How would you distinguish it from the resins of *false Jalaps*? Give the medicinal dose of *Jalap* and of the resin.

C.—*Broom*.—Give the pharmacopœial name of the drug; also the botanical name, the natural order, the habitat, and the official part of the plant. Describe the drug, and give its medical properties, and its dose. What important principles does it contain?

D.—*Mezercon*.—Name the plant or plants yielding it; also the natural order, and the habitat. Describe the physical characters of the drug, and its structure. What constituents have been obtained from it? Which of the constituents is acrid? Give the medical properties of the drug, and its dose.

E.—*Staranise*.—Name the plant and the natural order, the habitat, and the part used. Describe the drug, stating also the relative weight of its different parts, and the proportion of volatile oil yielded by these parts. Name some other drugs or plants, yielding volatile oils chemically identical with that of *staranise*.

F.—*Flaxseed*.—Name the plant, and the natural order. Give a description of the drug, and explain its structural characteristics. Name its important

medical constituents, and state the location of each in the tissues. In what percentage is one of the principles obtained by cold and hot pressure?

G.—*Lupulin*.—What is lupulin? Name the plant, and the part of the plant yielding it. Describe its physical properties, and its structure. Name its important constituents, and explain the change taking place on exposure. Give the medical properties of lupulin, and its dose.

H.—*Lactucarium*.—Name the plant and its natural order from which lactucarium is obtained. How is lactucarium procured? What are its physical properties? State the effect of simple solvents upon it, and give the percentage soluble in diluted alcohol. Name its bitter and other important constituents. What effect has alkali upon lactucarium? State the medical properties, and the dose.

I.—*Papaveraceæ*.—Name the plants of this order, yielding officinal drugs, and give the parts used; also, the most important constituents of each, a characteristic property or reaction of each constituent named, and the medicinal dose of each drug.

K.—*Adulterations*.—Describe the processes by which you would detect the following adulterations: 1., Oil of sassafras in oil of gaultheria; 2., Gum arabic in opium; 3., Starch in gamboge; 4., Saïcin in quinine; 5., Rosin in resin of scammony.

THEORY AND PRACTICE OF PHARMACY.

A.—1.—What is the specific gravity of the officinal liquid of which one fluid-ounce weighs 478.03 + grains?

2.—What is the liquid, and what is its specific volume?

3.—How many fluidounces of the liquid are there in a kilogramme?

4.—How many grains of the liquid are there in a cubic-centimetre?

B.—Give the unabbreviated officinal names, ingredients, brief outlines of process and describe the appearance of *Solution of Chlorinated Soda*, *Fluid Extract of Indian Cannabis*, *Aromatic Wine*, *Compound Tincture of Cinchona* *Basham's Mixture*, *Infusion of Digitalis*, *Compound Extract of Colocynth*, and *Vinegar of Opium*.

C.—Give the English names, ingredients, brief outlines of process, and describe the appearance of *Abstractum Jalapæ*, *Ceratum Sabinæ*, *Tinctura Nucis Vomice*, *Emplastrum Belladonnæ*, *Infusum Scennæ Compositum*, *Confectio Sennæ*, *Mistura Chloroformi*, and *Pyroxylinum*.

D.—Give the officinal ingredients and quantities used in making one pound *Avoidupois*, each of *Dorer's Powder*, *Oleate of Mercury* and *Tincture of Iodine*.

E.—Define the term, *vinous fermentation*, name the substances which must be present, and state the conditions requisite for the successful preparation of *wine*. Describe the various stages in the process for making *malt* and name the ferment which is active in the formation of malt. What does good *extract of malt* consist of, and what is its most valuable constituent?

F.—What are the officinal tests for the identity of *Sulphate of Quinine*? Explain the action of the officinal test (Kerner's) for impurities in *Sulphate of Quinine*. What impurities is this test designed to detect? What is the smallest percentage of these impurities that it is expected to discover?

G.—What are *Compressed Pills*? Draw a sketch or describe in words a form of apparatus, which may be used in making them upon a small scale, give a description of a machine for making them upon a large scale, what are the advantages and disadvantages attending the use of these pills.

H.—Describe a process for making *Gelatin Capsules* to contain liquids. How may they be filled and sealed? How are empty capsules which are intended to hold solids made? Describe a form of apparatus used for filling them with powders.

I.—1.—Write out a prescription for a four-ounce solution having a teaspoonful dose which shall contain 2 grains of a soluble iron salt, with a suitable tonic tincture.

2.—Write out a prescription for a four-ounce solution in proper proportion for a teaspoonful dose for adults which shall contain chloroform and elixir of orange.

3.—Write out a metric prescription of approved form for twenty pills, each containing the equivalent of 1-60th of a grain of strychnine and 2 grains of sulphate of quinine.

K.—Examine the following prescriptions and if you would dispense them, state the proper method and the quantity of finished preparation in each case.

R
 Potass. Permang..... gr. xij
 Fiant Pil. No. xxiv.
 Sig.—One, three times a day.

R
 Ext. Lupulini Fluid..... f 3 ss
 Acid. Hydrobrom. Dil..... f 3 ij
 Aquæ Menth. Pip. q s. ft..... f 3 vi

Sig.—A teaspoonful three times a day.

R
 Acid. Hydroc..... mxxx
 Potass Chlor..... grlx
 Aquæ ad..... f 3 ij

Sig.—A teaspoonful as directed.

R
 Chloralhydratis..... 3 i
 Camphoræ..... gr. lxiv
 Misce. fiat pulv. et div. in Chart. No. xli.

Sig.—One powder at night.

For Mrs. Brown.

R
 Syr. Ferri Iodidi.
 Liq. Potass. Arsen..... aa f 3 ij
 Syr. Tolu. ad..... f 3 iij

Sig.—A teaspoonful three times a day.

CHEMISTRY.

A.—Describe the metal *Copper*. State what are some of its important alloys and give their composition. Give the formulas of the officinal Salts of Copper.

B.—Give the chemical formulas of and describe *Hydrargyri Chloridum Corrosivum* and *Hydrargyri Chloridum Mite*. State what are the points of difference between *Hydrargyri Oxidum Rubrum* and *Hydrargyri Oxidum Flavum*. Give the chemical formulas of *Hydrargyri Subsulphas Flavus* and *Hydrargyrum Ammoniatum*.

C.—Describe the metal *Aluminum*. What are valuable properties possessed by this metal? How is Aluminum prepared? Mention any improved processes lately proposed or tried. Are any useful alloys known in the composition of which Aluminum enters.

D.—What are the several commercial varieties of the metal *Iron*? Give the physical and chemical differences of these varieties. To which of these varieties does the officinal *Ferrum* belong? What is the composition of *Ferrum reductum* and by what process is it made?

E.—State what are the tests relied upon for the detection of *Arsenic* poisoning. Give a brief description of the methods of procedure in applying these tests. How would you prepare by an officinal process an antidote to arsenic poisoning?

F.—What is an *Ether*? What is the distinction between a *simple* and a *compound Ether*? Give the chemical formula and state to which class *Aether* belongs. Give the chemical formula and state to which class *Aether aceticus* belongs. Give the chemical formula and state to which the nitrous ether of *spiritus aetheris nitrosi* belongs.

G.—What is *Fermentation*? Enumerate the several kinds of fermentation and write the chemical reactions for the changes that take place. What are some of the industries based upon fermentation processes? Name some official compounds that are products of fermentation?

H.—What is the chemical formula of *Acidum Benzoicum*? Give the sources of preparation of this acid, both natural and artificial. Give the formulas of the *alcohol* and *aldehyde* corresponding to this acid. Are either of these official and under what name or names?

I.—What is the difference between a *Phenol*, an *Aromatic Alcohol*, an *Alcohol-Phenol*, an *Aromatic-Acid* and a *Phenol-Acid*? Illustrate by an example of each class.

K.—What is the chemical composition of most of the *essential oils*? In what physical and chemical points do they differ from the *fixed oils*? What is a *Camphor*? What is the general chemical composition of the *Resins*? What of the *Balsams*?

EXAMINING COMMITTEE.

A.—What substances are used in the official process for *Diluted Hydrocyanic Acid*? State briefly the method of its preparation. Give the percentage strength of this Acid. State the process for its extemporaneous preparation. What reaction takes place during this process? How should the Acid be preserved?

B.—Give the official definition for *Chinoidin*. Name its principal active chemical constituents. Describe its physical properties. What are its best solvents? Is it reliable as a remedial agent? How is it generally administered?

C.—What is the *unit of capacity* in the metric system? How is it obtained from the meter? What is the metric *unit of weight*? How is it obtained? Express the weight of 1000 cc. of official *Glycerin*, *Nitric Acid*, and *Benzin*, according to the metric system.

D.—Give three tests for detecting Salts of *Ammonium*, and state how Salts of *Potassium* would interfere with these. Describe four tests for recognizing *Nitrates*. By what *chemical tests* would you distinguish *Potassium Nitrate* from *Potassium Chlorate*?

E.—What is *Argols*? How is it produced? What is the difference in color of the commercial article due to? What are the chemical constituents of *Argols*? How is it purified? What is the name of the purified product? What *acid* is obtained from it? Give the process for obtaining this Acid. What impurity is generally present?

F.—How long would it take to empty a vessel containing a gallon of official *Alcohol* at the rate of 2989.392 grains per second? How many grains of water will be required to add to a gallon of *Alcohol*, to make diluted *Alcohol*?

G.—Name the additional ingredients with weight of each necessary to add to one pound of Powdered Licorice Root, to make *Compound Licorice Powder*. State the mode of preparation, and give its official title.

H.—Name the ingredients which enter into the composition of *Compound Tincture of Benzoin*. Give the *botanical name*, *natural order*, *habitat*, and *official portion* of the plants yielding the constituents thereof.

I.—1. Should the two following prescriptions be prepared as written? How would you proceed?

R
 Tr. Tolu..... f 3 i
 Liq. Morph. Sulph..... f 3 ii
 M. ft. Mist. Secund. Art.
 Sig.—Half-teaspoonful as directed for cough.

2.

R
 Quin. Sulph..... gr. xxxii
 Tr. Ferri Chlor.
 Spt. Ammon. Arom..... aa f 3 iii
 Aquæ Font..... f 3 xiv
 M. ft. Solutio.

Sig.—A teaspoonful 3 times a day.

3. Give your method of procedure in full for the preparation and dispensing of the following recipe:

R
 Ol. Terebinth..... f 3 ss
 Pulv. Acaciæ.
 Sacch. Alb..... aa 3 iii
 Quin. Sulph..... gr. xxxii
 Aq. Ment. Pip..... q. s. ft. f 3 iv
 M. ft. Mist. Sec. Art.

Sig.—A teaspoonful every fourth hour.

C.

K.—1.

Potass. Iodid..... 3 ij
 Ammon Iodid..... 3 i
 Hydrarg Chlor. Corros..... gr. i
 Syr. Sarsap. Co.
 M. ft. Mist.

Sig.—“Hg Cl. 1-32.” Teaspoonful 3 times daily in water. P. C. P.

How would you dispense this prescription? Write a label for it in the blank furnished, numbering it 5001.

2. Would you dispense the following prescriptions? Give reasons for your action in each case.

R
 Tr. Ferri Chlor..... f 3 iv
 Strychninæ..... gr. jss
 Syr. Anrant Cort.
 Aquæ..... aa f 3 ii
 M. ft. Mist.

Sig.—“For Mr. Parrish.” A teaspoonful 3 times a day in a wineglass of water. R.

3.

Acid. Sulphuric..... f 3 ij
 Syr. Pruni Virg..... f 3 xiv
 M. ft. Mist.

Sig.—Teaspoonful 3 times a day.

SPECIMENS.

Materia Medica.

Pharmacy.

Chemistry.

Committee.

Ipecacuanha.	Cinchoninæ sulph.	Sulphur præcip.	Colchici semen.
Leptandra.	Pulv. Glycyrr. comp.	Sodii bicarb.	Cetraria.
Guaiaci lign.	Oleum Adipis.	Sodii hyposulph.	Oleum sa ssafras.
Prunus virg.	Tinct. Opii deodor.	Calx chlorata.	Ol. Theobromæ.
Stramonii fol.	Ferri sulph. præc.	Alumen.	Podophyllum.
Santonica.	Liq. Ferri tersulph.	Acid. aceticum.	Syr. Ferri iodidi.
Piper.	Linim. Chloroformi.	Acid. salicylic.	Acid. sulphuros.
Sinapis alba.	Extr. Sarsap. comp. fl.	Acid. tannicum.	Potass. bicarb.
Terebinthina.	Extr. Pruni virg. fl.	Benzinum.	Ferri Sulphas.
Aloe capensis.	Aqua Fœniculi.	Amylum.	Spir. Æther. nitr.

OPERATIVE PHARMACY.

1.

Put up a prescription, *secundum artem* each teaspoonful dose of which shall contain five minims each of tincture of guaiac and spirit of nitrous ether with sufficient water to make three fluidounces. *Write upon a separate label the contents of the bottle and attach it.*

2.

R. Ext. Coloc. Comp. gr. xxiv.
Abstract. Jalapæ gr. xviii.
Hydrarg. Chlor. Mit. gr. xviii.
Cambogiæ Pulv. gr. iv.

Make eighteen pills.

3.

R. Ext. Stramonii,
Acidi Tannici aa gr. iii.
Ol. Theobromæ gr. c.

Make six suppositories by rolling, without moulds.

4.

Mercury 240 grs.
Lard and Suet 240 grs.
Mercurial Ointment 20 grs.
Compound Tinct. Benzoin
30 drops.

Make official mercurial ointment.

5.

Spread a Soap Plaster 4x6.

The examination in *Analytical Chemistry* comprised the qualitative determination of from four to six salts of mineral and organic origin.

Twelve members of the graduating class, having attained the grade "very satisfactory" in the examination in *materia medica*, including specimens, were entitled to the competitive examination of microscopic specimens of drugs for the John M. Maisch prize. Of the nine candidates present, Mr. E. R. Stitt recognized the largest number, nine out of the following twelve: *Apocynum cannabinum*, *Stillingia*, *Senega*, *Triticum repens*, *Aspidium*, *Frangula*, *Cinchona Calisaya* (flat), *Conii fructus*, *Nux vomica*, *Lycopodium*, *Kamala*, *Arnica radix*.

Thirty-five candidates, who passed the examination, had not fully complied with all the requirements; their names will be subsequently reported to the Board of Trustees. 148 candidates were recommended for the degree of Graduate in Pharmacy (Ph. G.); their names, with the titles of their essays are as follows:

Paul Bucher Anspach, Pennsylvania, Acetate of Sodium.
Charles Butterworth Ashton, Pennsylvania, Sublimation.
Jacob Michael Baer, Pennsylvania, Liquid Extract of Malt.
William Louis Baum, Illinois, Polariscopes.
Addison Lloyd Beck, Pennsylvania, *Ricinus communis*.
Warren B. Beckler, Maine, Glycerin.
Emile Seraphine Bernardy, Pennsylvania, Camphora.
Ellsworth Smith Beshore, Pennsylvania, *Cypripedium parviflorum*.
Samuel Walter Bishop, New Jersey, Improvements in Pharmacy.
George Davis Blomer, Jr., Pennsylvania, Glue.
Charles Scott Bondurant, Missouri, Tussilago Farfara.
Charles Ducharme Boyd, Pennsylvania, Arsenic and arsenical poisoning.
Irvin Jacob Brandt, Pennsylvania, Syrupus Sarsaparillæ compositus.
Edgar Breneiser, Pennsylvania, *Mitchella repens*.
Frederick Kendall Brown, Delaware, *Catalpa bignonioides*.
William MacGilvray Buchholz, Pennsylvania, Hydrastis.

- Alfred Gray Burk, New Jersey, Cocaine.
 Robert Jump Burton, Delaware, Syrup of Wild Cherry.
 Orlin Ulysses Cassaday, Ohio, Chromates of the Cinchona Alkaloids.
 Charles Wesley Christ, Pennsylvania, Plants and their uses.
 Harry Gerheart Comp, Pennsylvania, Erythroxyton Coca.
 John Wesley Cotterel, Pennsylvania, Elixirs.
 William Monroe Clarkson Craine, Pennsylvania, Unguentum Hydrargyri.
 Orville Sharpe Creighton, Ohio, Ferrum reductum.
 Lewis Aylesworth Crull, Pennsylvania, Digitalis purpurea.
 Oscar Fingal Dana, Jr., Maine, Eupatorium perfoliatum.
 Eugene De Reeves, Texas, Extract of Wild Cherry Bark.
 Frank William Droelle, Michigan, Gaultheria procumbens.
 Howard Samuel Eckels, Pennsylvania, Sulphuric acid.
 William McKee Elden, Pennsylvania, Text Books of Pharmacy.
 Henry Everett Emerson, Pennsylvania, Residue of Tincture of Myrrh.
 Addison Henry English, New Jersey, Syrups by cold percolation.
 George A. Ennis, Delaware, Latin in Prescriptions.
 Edwin Reed Falloure, West Virginia, Pancreatic ferments.
 John Kirk Faust, Pennsylvania, Tincture of Vanilla.
 James Adams Ferguson, Pennsylvania, Aristolochia reticulata.
 Daniel Webster Fetterolf, Pennsylvania, Adulterations of Arsenious Oxide.
 Ira Elmer Finrock, Ohio, Incompatibilities.
 Robert Weiles Fisher, Delaware, Influence of sun-light on Iodine.
 Jonas Hezekiah Garman, Pennsylvania, Most important constituents of vegetable substances.
 Amandus George Georges, New York, Camphor and Chloral.
 Albert Frederick Graf, Pennsylvania, Goulard's Cerate with cosmoline.
 John Lincoln Grayson, Pennsylvania, Vanilla.
 William Grebe, Pennsylvania, Urinalysis.
 Frederick Hamilton Green, Iowa, Alchemy.
 P. Nettleton Guise, Ohio, Helianthemum canadense.
 Henry James Hackett, Pennsylvania, Digest of the Pharmacopœia.
 Edward John Hadfield, Kansas, Mercury and its preparations.
 Henry Haglin, Arkansas, Creasote.
 John Frederick Hamill, Pennsylvania, Pharmacy.
 William Lincoln Hartzell, Pennsylvania, Oleum Morrhuæ.
 Thomas Wesley Harrison, Pennsylvania, Triturations.
 William Finley Hasenplug, Pennsylvania, Adulteration of Opium.
 Andrew Jackson Heberling, Pennsylvania, Official Salicylates.
 Ralph Christian Herrmann, Pennsylvania, Erythroxyton Coca.
 Howard Huyett Hettinger, Pennsylvania, Rhubarb.
 Edmund Gilbert High, Pennsylvania, Plumbum.
 John Franklin Hildebrand, Pennsylvania, Olive Oil and adulterations.
 Charles Benjamin Hildreth, Ohio, Pepsinum.
 Arlington Grove Horine, Maryland, Thea.
 Kaspar Hørner, Texas, Antimonii et Potassii Tartaras.
 William Henry Hostley, Pennsylvania, Cimicifuga.
 Tod Howard, Ohio, Myrrha.
 Joseph Emil Huber, Illinois, Purification of Amylic Alcohol.

- Howard D. Huntsman, Pennsylvania, Lanolin.
 Henry Havelock Johnstone, Canada, Extemporaneous Chlorine Water.
 Frank Peter Keck, Pennsylvania, Volatile Oils.
 John Keiffer, Ohio, Hamamelis.
 Charles Kelchner, Pennsylvania, Zincum.
 Charles Emery Keller, Pennsylvania, Potassii Bicarbonas.
 Elmer Augustus Klapp, Pennsylvania, Chlorophyll.
 Jacob Glaes Kooker, Pennsylvania, Belladonna.
 Charles Krebs, Ohio, Spiritus Aetheris ferratus.
 Oscar Julius Lache, Pennsylvania, Rhus glabrum.
 Richard Henry Lackey, Pennsylvania, Mercury.
 John Joseph Lantz, Pennsylvania, California Wines.
 Carl Daniel Latterner, Illinois, Ulmas fulva.
 Joseph Frank Lehr, Pennsylvania, Extractum Carnis.
 Paul Leuschner, Michigan, The Linnæan System.
 John Nathan Grier Long, Pennsylvania, Medicinal Oleates.
 John Ligget Longshore, Ohio, Rhus Toxicodendron.
 Anna Lord, Delaware, Sulphuric acid.
 Samuel Steen Loughridge, Pennsylvania, Syrup of Hydriodic acid.
 John Thomas McClanahan, Texas, Cotton.
 Henry McDavit, New Jersey, Reduced Iron Pills.
 Charles William McKean, Ohio, Mercuric Oxide.
 Joseph McKee, Pennsylvania, Asclepias Curassavica.
 Charles Henry Martin, Kentucky, Stillingia sylvatica.
 Jesse Claude Marquardt, Ohio, Official Alcohol.
 Henry Snyder Manger, Pennsylvania, Grapes.
 Frank D. Mawhinney, Pennsylvania, Assay of Opium.
 Albert Henry Mayer, Pennsylvania, Aluminum.
 Caswell Armstrong Mayo, Mississippi, Purity of Alcohol.
 Samuel Stansbury Mell, Pennsylvania, Gymnocladus canadensis.
 Harry Edgar Mickey, Ohio, Oleum Gaultheriæ and Betula lenta.
 James A. Miller, Pennsylvania, Unguentum Zinci Oxidi.
 Thomas James Moffett, Indiana, Pharmaceutic manipulations.
 William Ervin Moyer, Pennsylvania, Ferrum.
 Harry Kendall Mulford, New Jersey, Pepsin, etc.
 Levi Allen Neiman, Pennsylvania, Rhamnus Purshiana.
 William Heisley Nelson, Pennsylvania, Fluid Extract of Ergot.
 Otto Christian Neumeister, Wisconsin, Mercurous iodide.
 Samuel Byron Ousey, Pennsylvania, Nicotiana Tabacum.
 Elmer Outten, Pennsylvania, Pharmacy.
 William Arky Partee, Tennessee, Phytolaccæ radix.
 John George Patton, Ohio, Petrolatum.
 Edward Pennock, Pennsylvania, Scutellaria.
 David Augustus Peters, Pennsylvania, Ergota.
 Pinckney Napoleon Pinchback, Louisiana, Chlorinè.
 William David Porter, Pennsylvania, Adonis vernalis.
 Charles Reh fuss, Ohio, Mentha piperita and its preparations.
 Charles Wesley Rinedoller, Pennsylvania, Subiodide of Bismuth.

George Parson Ringler, Pennsylvania, Mucilage and Syrup of Acacia.
 Norman Gruver Ritter, Pennsylvania, Adeps.
 Livingston Everett Rixstine, Pennsylvania, Conduct of the Drug Business.
 John Patterson Ross, Pennsylvania, Infusions and Decoctions.
 Charles Selmar Rottner, Pennsylvania, Salicylic acid.
 William Henry Saurer, Pennsylvania, Ceratum Plumbi subacetatis.
 Edward Francis Schneider, Ohio, Emulsions.
 Thomas La Blanc Schofield, Pennsylvania, Petrolatum.
 William Notson Seary, Pennsylvania, Carbolic Acid.
 Edward Grant Seibert, Pennsylvania, Polygonatum biflorum.
 Charles Albert Seither, Pennsylvania, Permanganate of Potash Pills.
 Franklin Philip Shaak, Pennsylvania, Syrup of Cranberries.
 Ellery Best Shoemaker, Pennsylvania, Acidum Arseniosum.
 Robert Edwin Lee Simmons, North Carolina, Diospyros virginiana.
 John Virgil Slaughter, New Jersey, Abstracts.
 Pharis Edwin Smith, Pennsylvania, Syrupus Ipecacuanhæ et Opii.
 Walter Adam Smith, Pennsylvania, Ilex opaca.
 Willard Eugene Smith, Delaware, Lycopodium clavatum.
 Oscar Alfred Sprissler, Pennsylvania, Polytrichum juniperinum.
 Gustave Steinmann, Wisconsin, Bitter principle of Leptandra.
 Edward Rhodes Stitt, North Carolina, Caffeine.
 William Henry Sutton, Ireland, Erythroxylon.
 John Derr Suydam, Pennsylvania, Pyrethrum.
 Bennett Lewis Taylor, Ohio, Irritant Poisons.
 Jay Chester Vanscoter, New York, Educated Pharmacists.
 George Lewis Wagner, Pennsylvania, Menthol.
 Gustavus Adolphus Weckler, Wisconsin, Lappa officinalis.
 Robert Fruit Welliver, Pennsylvania, Eriodictyon glutinosum.
 Frederick William Weidmayer, Ohio, Hydrastis canadensis.
 Reinhold Charles Werner, Wisconsin, Linseed oil.
 Heston Whitney, New Jersey, Xanthoxylon fraxineum.
 George Henry Wilkinson, New Jersey, Barium.
 Benjamin A. Wissler, Pennsylvania, Tobacco.
 George Washington Wolfersberger, Pennsylvania, Pills and pill excipients.
 Robert Taylor Young, Pennsylvania, Scaled salts of iron.
 Albert Theodore Zeller, New York, Stillingia.

A certificate of proficiency in chemistry was recommended to be awarded to Phil. Steiner Clarkson, of New Jersey.

The faculty invited the successful candidates, and the officers and trustees of the College to a reunion in the museum of the College building on the evening of March 16th, when a few hours were spent in pleasant intercourse. On this occasion the class presented to Prof. Maisch a handsome mantle-clock, to Prof. Remington a convenient easy-chair, and to Mr. Moerk, the assistant of the chair of chemistry, a number of valuable books.

On the evening of Friday, March 18th, the commencement exercises were held in the Academy of Music, when the degree of Graduate in Pharmacy was conferred upon the above-named candidates by the President of the College, Charles Bullock, and subsequently the degree of Master in Pharmacy—*honoris*

causa—upon Alfred B. Taylor of Philadelphia, class 1844; Wm. B. Webb of Philadelphia, class 1845; Chas. A. Heinitsch of Lancaster, the first President of the Pennsylvania Pharmaceutical Association; Prof. Wm. T. Wenzell of San Francisco, class 1855; and Prof. C. Lewis Diehl of Louisville, class 1862. The Procter medal was presented by President Bullock to O. U. Cassaday and C. S. Bondurant, and honorable mention was awarded to A. L. Beck, E. S. Beshore, C. B. Hildreth and W. A. Partee with the grade, "distinguished," and to E. Breneiser, F. W. Droelle, J. E. Huber, O. C. Neumeister, J. G. Patton and E. R. Shoemaker, with the grade, "meritorious." The H. C. Lea prize, \$100, for most meritorious work in connection with the thesis, was equally divided between A. L. Beck and E. G. Seibert. The latter received also the *Materia Medica* prize, a Zentmayer microscope for the histological examination of an American plant; and the former took, in addition, the Chemistry prize, an analytical balance, for original quantitative analysis. In connection with this prize, the work done by J. A. Ferguson, C. S. Bondurant, F. W. Droelle, E. S. Beshore and E. Breneiser was honorably commended. The Pharmacy prize, a gold medal, for original pharmaceutical work was presented to E. Breneiser, with honorable mention of E. J. Hadfield and W. V. Smith. The Analytical Chemistry prize, \$25, was awarded to E. S. Beshore, and honorable mention to C. S. Bondurant. E. R. Stitt received the J. M. Maisch prize offered by Mr. J. H. Redsecker, \$20, for histological knowledge of drugs; J. G. Patton, the Operative Pharmacy prize, offered by E. L. Boggs, \$25, for best examination in that branch; and A. L. Beck, the Theoretical Pharmacy prize, offered by Mr. H. J. Maris, a prescription balance. Honorable mention was accorded in connection with the Maisch prize to E. S. Beshore, C. S. Bondurant, C. D. Boyd, O. U. Cassaday, J. A. Ferguson, C. B. Hildreth, A. H. Mayer, W. A. Partee, E. G. Seibert, E. B. Shoemaker and G. Steinmann; in connection with the two Pharmacy prizes to C. S. Bondurant, E. Breneiser, O. U. Cassaday, F. W. Droelle, C. B. Hildreth and B. L. Taylor for the former, and to E. Breneiser, C. L. Bondurant and O. U. Cassaday for the latter.

In the valedictory address, Professor Remington gave some very interesting statistics in relation to the number of graduates thus far sent forth by all the colleges of pharmacy in the United States since their existence, and the proportion of graduates to the total number of proprietors, which is about 1 to 10½, and to the total number of proprietors and assistants, which is 1 to over 15. Prof. Remington also feelingly alluded to the decease, during examination time, of two senior students, Wm. D. Brooks of Memphis, Tenn., and Wm. G. Tittle of Harrisburg, Pa. The exercises were opened and interspersed with music, and closed with the distribution of floral and other gifts to many of the graduates. As in the preceding year, it was noticed that this custom of publicly bestowing such presents is on the decline, and it is to be hoped that before long it will be entirely abrogated, as has been done by several medical colleges in Philadelphia.

The *Alumni Association of the Philadelphia College of Pharmacy* held its twenty-third annual meeting in the College building, March 17th. The President, Wallace Procter, dwelled in his annual address on the necessity of a good general education of those intending to follow pharmacy as a pursuit, and urged the members to not consider the applications for positions in their stores,

unless the applicants were qualified for entering upon further studies, such qualification to be determined by the apprentice examination established by the College (see AM. JOUR. PHAR., 1886, p. 410 and 573). The President also recommended the continuance of the special committee appointed for the purpose of co-operating with the College towards the erection of a building on Tenth street for the accommodation of the library and museum, and for other purposes of the College.

The Secretary, Wm. E. Krewson, reported that the membership had increased during the past seven years from 480 to over 1200; during the last year 14 deaths had been reported. The social meetings of the Alumni Association, of which five were held during the course just closed, had been well attended.

The Treasurer, Edward C. Jones, reported the total receipts during the year to have been \$1878.49, the present balance being \$138.32.

The following officers were elected for the ensuing year: David W. Ross, class 1877, president; Clement B. Lowe, class 1884, and Dr. B. Frank Scholl, class 1882, vice presidents; Wm. E. Krewson, class 1869, recording secretary; Wm. N. Stem, class 1873, corresponding secretary; Wallace Procter, Jos. W. England and Prof. Henry Trimble (for unexpired term) executive board; Thos. S. Wiegand, class 1844, trustee of sinking fund, and Josiah K. Lilly, class 1882, orator for 1888, with Dr. H. Fisher, class 1877, as alternate.

The reception to the graduating class was held the same evening at the hall of the Academy of Fine Arts, which was crowded on the occasion. The exercises consisted of an address by President Procter, the awarding of the certificates of membership and of the alumni prizes; an oration by Thos. D. McElhenie, class 1872, of Brooklyn, N. Y.; the class oration by Walter A. Smith of Philadelphia, on "Unity;" the class history by Edward J. Hadfield of Dodge, Kan., and an address on the future of the class by the class prophet, Wm. C. Hepler of Reading, Pa. The gold medal was awarded to O. U. Cassaday of Alliance, O.; the quiz master's silver medal to E. S. Beshore of Bethel, Pa.; certificates for proficiency shown in examination to W. A. Partee of Nashville, Tenn., in materia medica; A. L. Beck of Sharon, Pa., in pharmacy; Chas. S. Bondurant of St. Louis, Mo., in chemistry; E. Breneiser of Reading, Pa., in general pharmacy; J. G. Patton of Youngstown, O., in operative pharmacy; F. W. Droeelle of Detroit, Mich., in analytical chemistry, and B. L. Taylor of Janesville, O., in specimens. Certificates were also awarded to Paul Leuschner of Detroit, for a very creditable collection of plants, and to Wm. Crutcher of Nicholasville, Ky., for the best junior examination. Twenty students and graduates who were members of the class in microscopy under the direction of A. P. Brown, Ph.G., and who had successfully passed the examination in that branch, received testimonial certificates.

The exercises of the evening were enlivened by songs from the College Glee Club—a novel feature, which deserves to be continued by future classes, if the requisite material, suitable voices, should be available.

Cincinnati College of Pharmacy.—The Commencement Exercises of the College were held at College Hall on the evening of the 17th of March. Addresses were made by President George Merrell, Hon. J. D. Cox, president of the University of Cincinnati, and by Prof. J. F. Judge, on behalf of the faculty of the College. The degree of Graduate in Pharmacy was conferred by President Merrell on the following graduates.

W. M. Bloss, Ceredo, W. Va.
L. J. Feid, Cincinnati, O.
Ernst H. Gierach, Cincinnati.
Edward W. Gray, New Vienna, O.
Jos. W. Hall, Ironton, O.
W. A. Hardy, Lebanon, O.
Winfield S. Heister, Springfield, O.
James Kennedy, Carlisle, Ky.
F. H. King, Delphos, O.
C. A. Kipp, Greenville, O.

Herman H. Koegels, Newport, Ky.
Louis F. Kolb, Paducah, Ky.
Herman Lohmann, Cincinnati, O.
Herman Oechsners, New Orleans, La.
Mrs. Kate A. Platts, Bellevue, Ky.
Edwin B. Tuteur, La Crosse, Wis.
Archer D. Tyson, Middletown, O.
Alb. D. Wells, Cincinnati, O.
A. O. Zwick, Covington, Ky.

Prizes were awarded as follows: H. H. Koegels, gold medal for proficiency in theoretical pharmacy, by Prof. Lloyd; E. B. Tuteur, gold medal for best examination in practical pharmacy, by Prof. Fennel; J. W. Hall, microscope for proficiency in materia medica and microscopic determination of specimens, by Prof. Coblentz; E. H. Gierach, gold medal for proficiency in chemistry, by Prof. Judge; A. O. Zwick, gold medal for best general examination by the Board of Trustees. F. W. Blesi, of the junior class, received the silver medal for best examination in botany, by Prof. James, and also the silver medal for best junior examination offered by the Board of Trustees.

After the close of the exercises the "Class Supper, was partaken of at the St. Nicholas, and was a very enjoyable affair.

Maryland College of Pharmacy.—The thirty-fifth annual commencement was held in the Academy of Music, Baltimore, on the evening of March 23d, when President Roberts conferred the degree of Graduate in Pharmacy upon the following 34 candidates:

Charles D. Allee.
Charles Arendt.
Claude M. Badgley.
G. H. Beckley.
J. Henry Blass.
Morris Binswanger.
C. L. Dohme.
J. H. Emmett.
Henry Fehsenfeld.
Wm. D. Hohmann.
H. S. Hambleton.

Caspar F. Jones.
H. E. Kelly.
J. Louis Krick.
John C. Krantz.
Wm. Frank Lucas.
N. C. Mules.
C. H. Michael.
Harry G. Murphy.
W. N. Owings.
A. A. Quandt.
E. E. Quandt.
Robert G. Reese.

Howard Schindel.
Henry A. Schmidt.
Wm. C. Shelton.
C. Urban Smith.
Martin H. Smith.
William J. Smith.
A. Showman.
John L. Porr.
Frank H. Waite.
A. Fuller Whiteside.
G. Howard Willett.

Five gold medals were awarded for examinations to R. G. Reese, W. J. Smith, and G. H. Willett; for analytical work to E. E. Quandt, and in practical pharmacy to M. H. Smith. The recipient of the junior class gold medal was W. L. C. Palmer. The valedictory address on behalf of the graduates was delivered by C. M. Badgley.

The New York College of Pharmacy held its 57th annual commencement in Steinway Hall on the evening of March 29th. The degree of Pharmacy was conferred upon 81 candidates, and two received certificates in chemistry and materia medica. The college prizes were awarded by vice-president Menninger, and the Alumni prizes by B. F. Hays, president of the Alumni Association. Addresses were made by the President of the College E. Mc Intyre, by I. M. Foster of the graduating class, and by Rev. R. Collyer, D.D.

Summer Courses in Colleges of Pharmacy.—The California College of Pharmacy gives its regular course of instruction always during the summer months, the next commencing April 4th. In the Universities of Michigan and Wisconsin the instruction in pharmacy is continued for several months after the regular courses of lectures have terminated in the other colleges. But the Chicago College of Pharmacy, as well as the Illinois College of Pharmacy, have made arrangements for two sessions annually, one during the winter, and the second during the spring, terminating early in summer. In most of the remaining colleges of pharmacy auxiliary courses, which are not obligatory, are carried on outside of the regular sessions. Thus at the Philadelphia College the chemical laboratory will be open during the greater part of the year, and the course in practical botany, inaugurated twenty years ago, will again be continued during the coming summer, the organization of the botany class taking place on April 13, at 4 P. M.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Yearbook of Pharmacy, comprising abstracts of papers relating to pharmacy, materia medica and chemistry, contributed to British and foreign journals from July 1st, 1885, to June 30, 1886. With the Transactions of the British Pharmaceutical Conference at the twenty-third annual meeting held at Birmingham, September, 1886. London: J. & A. Churchill. 8vo, pp. 606.

This welcome annual was received in February. A little more than one-half of it (346 pages) comprises the yearbook, which is designed to be a collection of abstracts of papers having pharmaceutical interest, and which were published during the preceding year; it covers the same ground as the Report on the Progress of Pharmacy in the Proceedings of the American Pharmaceutical Association. Nearly 200 pages are required for the minutes of the Conference and for the papers read at its last annual meeting. Like its predecessors the volume is quite valuable as an epitome of the pharmaceutical work done during the year.

The Principles of Pharmacognosy, an Introduction to the Study of the Crude Substances of the Vegetable Kingdom. By Friedrich A. Flückiger, Ph.D., M.D., Professor in the University at Strassburg, and Alexander Tschirch, Ph.D., Lecturer on Botany and Pharmacognosy in the University of Berlin. Translated from the second and completely revised German edition by Frederick B. Power, Ph.D., Professor of Materia Medica and Pharmacy in the University of Wisconsin. William Wood & Co., New York, 1887. 8 vo, pp. 310. Price, \$3.

Some time ago we announced that Professor Power was engaged in preparing a translation of Flückiger and Tschirch's "*Grundlagen der Pharmacognosie*," and we are pleased to announce now that the English version of this valuable work is before us. Having previously spoken in detail of the scope, arrangement and execution of the work, it remains now mainly to state, that the translation has been well done, and while the original text is closely followed, the English rendition does not suffer in clearness and precision. We may, therefore, in regard to the work before us repeat what we

stated on the appearance of the second German edition, that the subject matter of the work, the lucid and attractive manner of its treatment, the literary references, and the handsome illustrations, 186 in number, all combine to make the work a most valuable one for the study of vegetable histology, preliminary to that of materia medica.

Proceedings of the Michigan State Pharmaceutical Association at its fourth annual meeting, held in the city of Grand Rapids, October 12, 13 and 14, 1886; also the constitution and by-laws, roll of members, &c. Detroit: D. O. Haynes & Co. Svo, pp. 237.

A brief account of this meeting was published on page 18 of our December number. Among other valuable papers it contains one by Prof. Prescott, entitled "Outline of a Plan of Study of Assistants in Pharmacy;" a reprint of this paper has also been received.

A Plea for Legitimate Pharmacy versus Proprietary Articles partaking of the Character of Nostrums; with a compilation of formulæ for remedies prescribed by physicians and lists of simple remedies. By Emlen Painter, Ph.G. Svo, pp. 35.

The author is earnest in his plea concerning a subject which has been frequently discussed in this Journal in the past. A number of factors have been operative in producing the continually increasing proprietary articles; one of these factors must be looked for in the indifference of many apothecaries and their want of pride in preparations of their own make, even simple pharmacopœial galenicals, through which course the laboratory of the pharmacist has been reduced in extent, and that of the manufacturer more increased.

Manuel des Étudiants en Pharmacie. Par Ludovic Jammes, pharmacien de 1re classe, médecin. Paris: J. B. Baillière et Fils, 1886. 12mo, pp. 475 and 768.

Manual for Students in Pharmacy.

The two volumes before us give an interesting picture of the educational course prescribed by law for pharmacists in France. The first volume opens with the decrees, decisions and regulations relating to the studies and the examinations of pharmacists. There are two classes of pharmacists; those of the first class may settle in the large cities, but those of the second class only in certain districts. Yet the requirements for the two classes are very similar—three years apprenticeship in a store, and examination in practical pharmacy and practical botany, and subsequently three years studies at a pharmaceutical school; they differ mainly in the preliminary education required, and in the extent of the final examinations. To become a pharmacist of the first class, the aspirant is required to produce, when entering as apprentice and when matriculating at the school of pharmacy, the diploma of bachelor of arts or bachelor of sciences; of others either the grammar school certificate, or the certificate of proficiency in the first stage tow-

ards the bachelorship in arts is required. The studies at the school comprise lectures and laboratory work during the whole three years, and an examination must be passed at the end of each year in the branches taught, namely in organic chemistry, chemical analysis, toxicology, physics, pharmacy, *materia medica*, mineralogy, hydrology, botany and zoology.

All these subjects except systematic chemistry, physics and zoology are included in the two volumes referred to above; and they are arranged in the following order: Chemical analysis with the well-known scheme for the separation and recognition of the metallic elements occupies 74 pages. The reactions of the most prominent alkaloids are given; also the means for recognizing the inorganic and the more common organic acids, and the behavior of the various substances before the blowpipe. This is followed by toxicology, which chapter, comprising 114 pages, is mainly devoted to the chemical processes for the detection of poisons; the toxic doses and antidotes are also mentioned, and attention is drawn to the necessity of searching for vegetable and animal fragments in case the poisoning occurred through poisonous plants or through cantharides.

The last 240 pages of the first volume are devoted to "Pharmacy," and treat of pharmaceutical operations and pharmaceutical preparations. The latter are arranged under medicaments for internal use and for external use, and the former are again divided into such prepared by solution in water, alcohol, ether, wine, vinegar and beer, or by distillation, evaporation and in other various ways. This part of the book contains the formulas for all the galenical preparations of the new French Codex.

The second volume opens with a chapter on the microscope and its uses, including the preparation of objects, staining, preservation, measuring, chemical testing, etc. It is primarily intended as an introduction to the next chapter on vegetable histology, in which the formation of cells, the various tissues and the anatomical structure of roots, stems and leaves are considered. Under organography, the various organs of nutrition and of reproduction are described and their functions explained. Next follows systematic botany, with the orders arranged principally according to De Candolle; the botanical descriptions are brief, the most striking characteristics being pointed out, except in the case of medicinal plants indigenous to France, which are described somewhat more minutely.

After the brief discussion of some geological questions and the explanation of crystallography, mineralogy is taken up, the minerals being concisely described according to composition, crystalline form, density, hardness, fracture and other physical properties, and their uses are indicated.

The chapter on hydrology treats of water in its various forms, including mineral waters and their analysis, and it is followed by the "Natural History of Simple Drugs." The arrangement of the animal and vegetable drugs is according to their origin, so that in the latter case we have a repetition of the botanical classification in another part of the same volume, but no botanical descriptions, the drugs themselves being briefly described, together with their important constituents and their uses.

The two volumes embrace the subjects of the first and second years examinations of the French pharmaceutical student, and in their necessarily condensed form are well adapted for reviewing the studies covering such a large field. There are about 270 good illustrations, most of them being useful for explaining the subjects in connection with which they have been used.

Hand Book of Materia Medica, Pharmacy and Therapeutics, including the physiological action of drugs, the special therapeutics of disease, official and extemporaneous pharmacy, and minute directions for prescription writing. By S. O. L. Potter, M.A., M.D., Professor of the Theory and Practice of Medicine in the Cooper Medical College of San Francisco, etc. Philadelphia: P. Blackiston, Son & Co. 1887. 8vo, pp. 828. Price \$3.

This work has been written for the use of physicians, and will doubtless prove of value owing to its condensed form and the general correctness of the statements relating to physiological action and therapeutic application. The first part contains upon nearly 400 pages an enumeration of pharmacopœial and other drugs arranged in alphabetical order, giving under each head the Latin and English names, the derivation, and a brief description, usually condensed from the Pharmacopœia, the most striking characters being preferably given; these are followed by the constituents, the preparations, physiological action and therapeutics. It is particularly in the constituents that quite a number of inaccuracies occur. Jalapin is said (p. 350) to be probably identical with convolvulin, which is insoluble in ether, and the ether soluble resin of jalap is called jalapin (p. 238) although it is re-precipitated from its alkali solution by acids. Oil of juniper, a hydrocarbon, is stated (p. 240) to consist of terpenes and camphors; kamala is said to contain starch; the terpene valerene of oil of valerian (p. 384) to be produced by oxidation; olive oil (p. 273) to contain the stearopten palmitin; the crystalline lactucerin (p. 244) to resemble caoutchouc, etc. The first part closes with a well-written chapter on the classification of medicines.

The second part is on pharmacy and prescription writing. The pharmaceutical operations, the different classes of pharmacopœial preparations, and weights and measures are briefly explained, followed by a chapter on prescriptions, in which a great deal of good advice is given, notably in the paragraphs on prescription writing and prescription blanks. The succeeding paragraph on renewals opens well, but a few lines further on the author enters upon the war-path against the "average druggist," and finally pictures the good results for the pockets of the patient and of the physician, and the loss to their "enemies," if the physician was to carry a small stock of ready-made medicines. The second part concludes with the consideration of incompatibles and of the various forms of extemporaneous preparations.

Part III is devoted to special therapeutics, the diseases being considered in alphabetical order; and an appendix contains a list of Latin words and phrases, genitive case endings, various formulas, treatment of poisoning, differential diagnosis, clinical examination of urine, and other useful information. A carefully prepared index facilitates the use of the book.

Pocket Medical Formulary arranged therapeutically. By A. Hazard, M.D., and B. M. Goldberg, M.D. Revised and enlarged by A. S. Gerhard, A.M., M.D., Professor of General Pathology, Medical Jurisprudence and Clinical Medicine at the Medico-Chirurgical College, Philadelphia. With an Appendix containing formulas and doses of hypodermic medication, a table of eruptive fevers and poisons, their symptoms, antidotes and treatment. Philadelphia. Collins, printer, 1886. 16mo, pp. 334. Price, \$2.

The title of this little book fully explains its scope. Eleven hundred formulas are given, a large number being by prominent American physicians, and each is credited to its author. The arrangement is alphabetical, on a therapeutic basis, and by the use of the patent index all references are readily made. With each letter a number of blank leaves have been bound for the recording of additional formulas. The book is bound in flexible morocco, and being conveniently carried in the pocket, is always readily accessible to the practitioner.

Conklin's Handy Manual of Useful Information. Compiled by Prof. G. W. Conklin of the Hamilton University, Chicago. G. W. Ogilvie. 24mo, pp. 316. Price, 25 cents.

It contains a large number of statistics, and in a condensed form a great deal of information on all kinds of subjects.

Karl Theodor Mohr. Eine Biographische Skizze mit Einleitung, Aphorismen zur Geschichte der Pharmacie.

This reprint from the February number of the *Pharmaceutische Rundschau*, New York, contains a biographical sketch of Mr. Chas. T. Mohr of Mobile, Ala., whose explorations of the flora, more especially of the South-western states, have made him favorably known at home and abroad. The introduction, Aphorisms to the History of Pharmacy, is from the pen of the editor, Dr. F. Hoffmann.

Die Untersuchungs Anstalten für Nahrungs- und Genussmittel sowie Gebrauchs-Gegenstände, deren Organisation und Wirkungskreis. Referat von Herrn Professor Dr. Albert Hilger (Erlangen). Braunschweig. Fr. Vieweg & Sohn, 1887. 8vo, pp. 26.

This pamphlet is a reprint from the German Quarterly Journal of Public Hygiene, and contains the transactions of the German Society for public hygiene in relation to a report made by Prof. Hilger on the organization and sphere of action of public institutions for the examination of articles of food, drink and general use.

Twenty-eighth Annual Report of the Inspector of Milk and Vinegar for the year 1886. Boston, 1887. 8vo, pp. 63.

The report is by Prof. Jas. F. Babcock, who acted as chemist for the department of inspection for a number of years, until he was placed at its head.

Record of Experiments at Fort Scott, Kansas, in the manufacture of sugar from sorghum and sugar-canes in 1886. By H. W. Wiley, chemist. Washington, 1887. 8mo, pp. 64.

This is Bulletin No. 14, of the U. S. Department of Agriculture, Division of Chemistry.

Ueber den Nachweis des Cocains im Thierkörper. Von Leonhard Hemsing. Dorpat 1886. Pp. 39.

On the detection of cocaine in the animal body.

Éthérification de l'acide sulphurique dans l'eau de Rabel. Par Théophile Gautrand. Montpellier, 1787. Pp. 48.

Etherification of sulphuric acid in Rabel's water (alcohol and sulphuric acid, 3 : 1).

Papaina sua accao physiologica e therapeutica. Por Domingos Alberto Niobey. Rio de Janeiro, 1887. Pp. 92.

Papain, its physiological action and therapeutics.

We hope to prepare abstracts of the above three theses for a future number of the journal.

The Doctorate Address at the semi-centennial anniversary of the University of Louisville, Medical Department, March 2, 1887. By Professor David W. Yandell, M. D. 8vo, pp. 16.

Valedictory Address, Medical Department, University of California. By Professor A. L. Lengfeld, M. D. 8vo, pp. 12.

The Increased Efficacy of Massage, in combination with the electro-vapor bath. By F. E. Stewart, M. D., Ph.G.

Reprint from the *Medical Register*.

Sterility. Management of the Secundines. By Prof. W. A. Wathen, M. D., Louisville.

Report on Diseases of the Rectum. By Prof. Jos. M. Matthews, M. D., Louisville.

The reception of the above reprints is acknowledged.

The Source of the Mississippi. 4vo, pp. 16.

This interesting pamphlet is a reprint from "Science" of December 24, 1886, and contains a letter from Messrs. Ivison, Blakeman, Taylor & Co., (the publishers of *Science*) and the report of Hopewell Clarke, Chief of the I., B., T. & Co. expedition to the headwaters of the Mississippi, October 1886.

The Connoisseur. Illustrated quarterly of art and decoration. Published by Bailey, Banks & Biddle, Philadelphia. Price 50 cents a year.

An interesting and instructive periodical for lovers of art, containing instructive papers on various subjects and a large number of finely executed illustrations.

THE AMERICAN JOURNAL OF PHARMACY.

MAY, 1887.

SOME CONSTITUENTS OF YERBA SANTA.

By R. ROTHIER.

A syrup prepared from *Eriodictyon* leaves is extensively used for the administration of quinine in a bitterless form. It also affords the further advantage of extinguishing the bitter taste of quinine when taken immediately after the use of mixtures in which it would otherwise be chemically incompatible. In order to disguise the bitterness of quinine when given in a fluid state, it has been variously exhibited in the condition of insoluble salts. The great objection to this mode of procedure is that these quinium compounds remain partially insoluble, and hence inoperative, in both alkaline and acidine contacts. Some of these combinations, although remarkably insoluble in the main, are by no means destitute of the nauseous bitter taint.

The important advantage possessed by *Yerba Santa* consists not only in the phenomenal suppression of the bitterness of quinine, but also in its presentation in a readily assimilable state.

A certain resinous component of *Eriodictyon* leaves is characterized by the property of forming in contact with some bases very soluble seemingly saline compacts. These, when merged with quinium salts generate by double decomposition an ordinarily insoluble quinium-resin salt. This compound is promptly decomposed by the stronger acids, and is peculiarly soluble in ammonia.

When coarsely ground *Eriodictyon* leaves are percolated with water, a moderately dark brown colored and somewhat bitter percolate is obtained. On evaporating this to a syrupy consistence and treating this residue with alcohol, a light brown liquor and dark brown pasty residue results. The alcoholic solution has acquired all of the peculiar bitterness of the percolate whilst the pasty mass is practically tasteless. On treating this residue, or the original one resulting from the percolate, with potassium carbonate, an ammoniacal odor becomes quite pronounced. The addition of an acid to the dark brown mass, separated by alcohol, yields a profuse precipitate which is wholly but slowly dissolved to a dark brown solution by a large volume of water.

When the residuary leaves in the percolator are treated with water rendered strongly alkaline with ammonia, the first portion of the new percolate is very turbid, but becomes clear as the free ammonia descends into the precipitate. A considerable proportion of alkaline menstruum is needed to extract the color-giving substance wholly. Evaporation of the percolate to a syrupy residue and treatment of this with alcohol, yields a brown red bitter solution, and a profuse dark brown precipitate. The solution and precipitate are in all respects identical to those obtained in the first percolation. The alcoholic solution contains the quinine precipitant in union with ammonia as an acid salt. The addition of water causes a dense milkiness, and acidulation with a strong acid precipitates the acid resin in curdy flakes. Excess of ammonia added to the alcoholic solution causes no precipitate, but the color is very perceptibly deepened. On exposure of this mixture the excess of ammonia and much of the alcohol is dissipated, whilst a red-brown tarry acid ammonium salt deposits.

The precipitate given by alcohol appears to be an acid ammonium salt of the tasteless and non-quinine precipitating acid component of the leaves. When treated with water an inconsiderable proportion dissolves, leaving a large residue. Addition of ammonia or potassium carbonate and much water dissolves this wholly to a deep red-brown solution. The tinctorial power of this body is its most remarkable property. In its natural condition it is very probably in great part an acid anhydrate, which is dissolved by aqueous solutions of alkalis and their carbonates. Under these circumstances no perceptible effervescence occurs, when carbonates are employed. With the use of monocarbonates the solution contains bicarbonate, showing that the reaction is like to that resulting in similar cases with analogous matter from other plants. On adding ferric chloride to such a solution, no precipitate at first appears. The continued addition of it, however, causes an abundant brown-black precipitate soluble to a great extent in an excess of the reagent. It is also partially soluble in ammonia with a deep red-brown color. The addition of ammonia to a mixture containing excess of ferric chloride gives a precipitate utterly insoluble in ammonia. These results show that the various proportions of the tinctorial body appended to basic radicles determine the degree of solubility and insolubility of the compound. As already stated, strong acids occasion a precipitate when added to alkaline solutions of this substance. Boiling of the mixture with dilute sulphuric acid appears to generate a new insoluble sub-

stance readily soluble in alcohol and in ammonia, with intense red-brown color. The solutions are characteristically tasteless.

The tarry acidic ammonium salt of the quinine precipitant is readily and perfectly soluble in a sufficiency of alcohol. It is also readily and completely soluble in excess of ammonia. When treated with ether, a portion of the acidic component is dissolved. A correspondingly less acidic salt, however, remains undissolved. The action of chloroform is precisely similar in this. The acidic resin thus separated has an all-proportional solubility in these menstrua. It remains as a green-yellow transparent mass after the spontaneous volatilization of the respective solvents. It reacts with monad monocarbonates, converting them into bicarbonates. It is readily soluble in bicarbonates, evolving no carbonic anhydride except on heating. When the solution obtained with sodium bicarbonate, for instance, is evaporated, a portion of the resin separates and is readily taken up by ether or chloroform. Alcohol, however, dissolves an acidic sodium salt of the resin.

Treatment of *Eriodictyon* leaves with alcohol, dilute or strong, wholly removes the quinine precipitant. But this method of isolating it is neither economical nor practical.

A fluid extract of *Yerba Santa* limpidly miscible with simple syrup is a desideratum. The writer has heretofore employed ammonia as a part menstruum in preparing syrup of *Yerba Santa*. In order to secure an effective extraction an excess of ammonia is essential. It is difficult, however, to adjust a proper proportion, and hence the ammonia may preponderate in the finished syrup. The writer would suggest a fluid extract of *Yerba Santa* for preparing the syrup to be used in the proportion of one fluidounce for one pint of the syrup. This fluid extract is merely an alcoholic solution of normal potassium eriodictyonate uncontaminated by the dark colored non-quinine precipitant. The following is the process recommended :

Yerba Santa leaves, coarsely ground.....	16 Troy ounces.
Potassium carbonate.....	3 “
Ammonia water.	
Alcohol.	
Water. Of each sufficient to make one pint.	

Mix ammonia water and water in the proportion of one measure of the first and seven measures of the second. Mix the *Yerba Santa* with eight fluidounces of this mixture and pack it firmly into a

cylindrical glass percolator. After due maceration pour on menstruum until 3 pints of percolate has slowly passed. To this add the potassium carbonate and evaporate it until a pasty residue is left. Stir this well with 8 fluidounces of alcohol, gradually added; let the pasty precipitate subside and decant the supernatant liquor. To the residue gradually add 8 fluidounces of alcohol, as before, pour this mixture upon a strainer and force the liquid out. Should this second extraction measure more than is needed to complete the intended volume of fluid extract, dissipate the excess of alcohol by appropriate means; unite the residue with the first extraction, set the mixture aside for twenty-four hours, and decant the clear fluid extract from the scant crystalline deposit meanwhile formed.

CONSTITUENTS OF SOME AMERICAN PLANTS.

ABSTRACTS FROM THESES.

Mitchella repens, Lin.—An analysis of this plant was made by Edgar Breneiser, Ph. G., with the following results: Volatile oil was found to be absent. Petroleum-benzin dissolved 1.180 per cent., consisting of chlorophyll and wax, the latter saponifiable by alcoholic potassa solution. Ether took up 1.400, of which .240 was soluble in water, and .940 soluble in alcohol. The aqueous solution contained a principle precipitated by tannin and by picric acid, but neither alkaloid nor glucoside. The resin taken up by alcohol was soluble in potassa and this solution yielded nothing to benzin, benzol or chloroform; the liquid obtained on treating the resin with acidulated water, gave precipitates with tannin and picric acid, but yielded nothing to benzin, benzol or chloroform. The alcoholic extract of the plant amounted to 3.800 per cent., of which 3.440 was soluble in water, and this contained 1.630 glucose, estimated by Fehling's solution. Water now dissolved from the plant 20.699 per cent., from which alcohol precipitated 5.440 mucilaginous matter and .536 inorganic compounds; the further addition of alcohol precipitated 3.679 dextrin and allied carbohydrates; 6.009 glucose was found; also a saponin-like principle (precipitated by baryta, and frothing in aqueous solution.) Dilute soda solution dissolved 2.360 albumin, 1.840 other organic matter and .120 inorganic matter; total, 4.320 per cent. Di-

lute hydrochloric acid took up 4.418 organic and 2.820 inorganic matter, total 7.238. Treatment with chlorine occasioned a loss of 11.784 per cent.; the residue now weighed 33.460, and after deducting 11.240 for moisture in the drug, the loss not accounted for by the analysis, amounts to 4.879 per cent. The ash of the air dry plant weighed 5.440 per cent., only .360 of which was soluble in water; the ash consisted of carbonates, chlorides, sulphates and phosphates of sodium, potassium, calcium, magnesium and iron.

Eupatorium perfoliatum, Lin.—The percentages of extract obtained from this plant by the successive treatment with different solvents, has been ascertained by Oscar F. Dana, Jr., Ph. G. The results are as follows: moisture 10.50, extract by petroleum benzin 3.80, by ether 4.60, by alcohol 33.80, by water 24.80, by alkali 5.80, cellulin 11.70; loss by treatment with chlorine, &c. 5.00. The ash amounted to 8.3 per cent. Crystals were observed in the benzin extract, and were prepared in larger quantity, by exhausting the plant with alcohol, treating this extract with ether and the ethereal extract with benzin. Thus obtained the crystals were still impure and were not further examined.

By the same process these crystals were obtained by G. Latin, (AM. JOUR. PHAR. 1880, p. 392,) who succeeded in obtaining them white and showed them to be wax or possibly resin. The bitter principle has been obtained by Latin in a pure or nearly pure condition and found to be a glucoside; he states it to be soluble in ether, while according to M. Parsons (AM. J. PH., 1879, p. 342,) it is insoluble in the menstruum named.

Leptandra virginica, Nutt.—To obtain the bitter principle, Gust. Steinmann, Ph. G., poured the concentrated tincture into water, and agitated the acidulated aqueous solution with petroleum benzin, benzol and chloroform; only the benzol liquid yielded a residue which was crystalline. 500 gm. of the drug yielded only 0.5 gm. of the crystals, which after recrystallizing from ether, were of a pale lemon-yellow color, of a peculiar agreeable color, and of a very bitter taste. They were found to be insoluble in petroleum benzin, soluble in alcohol, ether and benzol, less freely soluble in cold water, not precipitated by Mayer's solution or by tannin, and not yielding glucose on being boiled with dilute sulphuric acid. The resinous matter precipitated by water from the alcoholic extract, loses the bitter taste almost completely by repeated solution and precipitation.

Catalpa bignonioides, Walter.—The seeds were examined by Fred. K. Brown, Ph. G., who demonstrated the presence of resin, fixed oil, tannin and sugar, and on distilling with water, obtained a distillate having somewhat of a rancid odor. Two crystalline bodies were obtained by treating the powdered seeds with a mixture of ether, alcohol and ammonia, acidulating the concentrated filtrate, removing oil and other impurities with ether, neutralizing with ammonia, and agitating with a mixture of ether and chloroform; on evaporating the ethereal solution, needles were left, which were soluble in alcohol, ether and chloroform, insoluble in water, almost tasteless and after boiling with dilute sulphuric acid did not reduce Fehling's solution. The aqueous liquid, left after treatment with ether and chloroform, yielded crystals, which must have contained ammonia sulphate, and possibly also a glucoside, since after boiling with sulphuric acid, a reaction with Fehling's solution was obtained.

Ilex opaca, Aiton.—On treating the leaves with benzin, Walter A. Smith, Ph. G., obtained 1.2 per cent. extract, of which .088 was volatile and had an acrid mustard like odor; the remainder consisted of fat and .152 wax. Ether extracted 4.5 per cent. .5 of which was soluble in water, the remainder being resin soluble in alcohol; the aqueous solution had a bitter taste, and from its behavior to Fehling's liquid appears to contain a glucoside. Tannin and chlorophyll were found in the alcoholic tincture. The leaves yielded 4.5 per cent. of ash.

Gymnocladus canadensis, Lamarek.—Samuel S. Mell, Ph. G., observed that the seeds weigh on the average 30 grains, contain 8.5 per cent. of moisture, and yield 2.75 per cent. of ash. Petroleum benzin extracts about 10 per cent. of fixed oil, which is yellowish, saponifiable, and of the spec. grav. .919. Ether extracts a little wax, fat and resin. The alcoholic extract amounts to 3.25 per cent. and contains a little tannin and a small quantity of glucoside which can be removed from the aqueous solution by chloroform, and which appears to be present also in the immature fruit; it has a peculiar odor and an acrid burning taste. The seeds contain also mucilage, starch and albuminoids.

EXTRACTUM PRUNI VIRGINIANÆ FLUIDUM.

By CYRUS M. BOGER, PH. G.

Read at the Pharmaceutical Meeting April 19, 1887.

Perhaps no other drug in the pharmacopœia has been investigated as much and written upon as often as Wild Cherry Bark.

While many valuable additions have from time to time been made to our knowledge concerning it, yet its preparations remain for the most part unsatisfactory.

The design of this paper is the discussion of its fluid-extract; the chief objects to be attained in making this are:

1. To develop all the hydrocyanic acid the bark is capable of yielding.

2. To have as little tannic acid present when finished as possible.

3. To have it free from a precipitate—The U. S. Pharmacopœia process fulfils none of these requirements; why does it not?

1. Because the time allowed for maceration is too short.

2. The addition of glycerin hinders the development of prussic acid during maceration.

3. The drug is not moistened sufficiently to develop all the acid.

Experience has proven that sixty hours at least must be allowed for the full development of the acid and that seventy-two hours is not too long.

The viscosity and therefore the immobility of a liquid materially affects the rapidity of chemical action; the advantage to be gained from the addition of glycerin to the macerate is therefore not apparent and experience has shown its influence to be inimical in this process.

The hydrocyanic acid does not develop well when the bark is not moistened sufficiently, any more than it does when made too wet; actual practice has shown that the U. S. Pharmacopœia process does not allow sufficient moistening. Just here it may be remarked that after the addition of the macerate the bark should not be packed at all but put loosely into a percolator until it is time to pack it for the percolation.

The matter of tannic acid has puzzled a great many persons and it is quite enough to say that the addition of a large quantity of glycerin to the formula has not reduced the amount dissolved, even if it has helped to hold it in solution; seeing that the acid is freely soluble in both water and alcohol there is little hope that very much can be ac-

complished in the direction of ridding the product of this constituent of the drug, unless indeed we should have resort to an expedient of perhaps questionable propriety and add to the macerate a small quantity of some acid, thus rendering the tannin less soluble ; experiments in this direction have however not been made.

The presence of a precipitate is due to the fact that the menstruum of dilute alcohol is not allowed to thoroughly mix with the macerate before percolation begins, thus the first part of the percolate differs from the last part ; this must naturally cause a precipitate.

The following formula has yielded excellent results and develops all the prussic acid ; there is no precipitate nor does any form on standing as will be seen from the specimen which is seven months old and has never been filtered ; and I had a specimen, which has unfortunately been mislaid, which was over a year old and is identical in appearance and odor with this :

Take of Ground Wild Cherry Bark..... ʒ xvi.

Water and Alcohol, each.....f ʒ x.

Glycerin..... ʒ iv.

Moisten the bark with ʒx of water and put loosely in the percolator, close tightly and allow it to macerate sixty hours ; then pack very firmly, mix the ten fluidounces of alcohol and four of glycerin and pour it upon the bark, now cork up the percolator tightly and macerate twenty-four hours longer ; at the expiration of this time remove the cork and about twelve fluidounces of percolate will come through ; water should now be poured on to force the other four fluidounces out when the percolation should be stopped and the product will be finished. After an extended experience the conclusion was reached that to continue the percolation beyond this point is worse than useless as it necessitates subsequent evaporation ; nor does it add any medicinal strength to the preparation. It does add quite a considerable quantity of tannin and gallic acid, which latter results from the conversion of the tannin by heat.

EMULSIONIZING OF CHLOROFORM AND ETHER WITH GUM ARABIC.

BY T. S. WIEGAND.

Read at the Pharmaceutical Meeting April 19, 1887.

Having frequent occasion some time since to prepare mixtures of chloroform with gum arabic I was much annoyed by the customer complaining that it was not always the same strength when I was positive that the prescription was dispensed by a careful and skillful operator; this was only to be accounted for by the escape of the chloroform owing to its great volatility while being emulsionized. Seeking to avoid the complaint I was led to try a number of experiments, and tried mixing it in the method so successfully adopted for emulsions of oil of turpentine, viz. : that of putting the powdered gum in a dry bottle, pouring on the chloroform, shaking them thoroughly, and then adding the water with constant shaking. While this completely mixes the chloroform it does not remain as a full, well-mixed emulsion, but separates into two layers, a white thick one which contains the gum and chloroform and a clear thin one mostly of water only. When making a mixture containing ether the result was quite different, the gum being put, as before, in a dry bottle, the ether added and lastly the water—an emulsion was effected very quickly and it was nearly transparent; upon standing a separation took place, the gum and ether rose to the surface as a transparent layer and under it the water; these were very easily mixed by simply shaking and a complete suspension of the ether was effected.

The advantages of this process are two-fold, the rapidity by which it can be effected, and the certainty of the mixture being always uniform.

This process is almost identical with one proposed by Prof. Parrish and printed on page 189 of volume A. J. P. for 1872.

In this connection it is well to state, for the benefit of the younger pharmacist, that in those cases where a large number of *drops* of very volatile liquid is ordered, that it is better to drop some even part of the number into a minim measure and note the number of minims and then measure the proper quantity, as in this way the danger of mistakes in counting is avoided and also the loss that occurs by evaporation while counting.

SYRUP OF TOLU BY A NEW PROCESS.¹

BY FREDERICK STEPHENSON.

There are various published formulæ for the preparation of this syrup, the more important of which are as follows:—

1. The B. P. formula in which the balsam is ordered to be boiled with water for half an hour in a lightly covered vessel, filtered when cold, and the sugar dissolved in the filtrate by the aid of heat.

2. The former United States Pharmacopœia formula, in which tincture of tolu is rubbed up with the carbonate of magnesia, a little sugar and water, filtered, and the sugar dissolved in the filtrate by the aid of the heat.

3. In the French Codex the balsam is ordered to be digested for two hours with one half of the water at the temperature of a water bath. It is then re-digested with the other half in the same way, the mixed liquids cooled, filtered, and the sugar dissolved by the heat.

4. In the 1883 United States Pharmacopœia the balsam, sugar and water are ordered to be digested in a covered vessel for two hours at a temperature not exceeding 180° F., and strained through a wetted muslin strainer when cold.

The chief object to be aimed at in syrup of tolu appears to be to secure the full flavor of the balsam which is said to be due to tolene, cinnamate of benzyl and benzoate of benzyl, all of which are volatile liquids. It also contains doubtless small quantities of cinnamic and benzoic acids, but these do not appear to be of primary importance. On this account all the above formulæ strike one as more or less faulty.

Any one who has made the syrup by the first process must have felt that the boiling caused a considerable loss of volatile odorous principles. The second process is also faulty for the reason that the carbonate of magnesia retains some of the volatile constituents as well as cinnamic and benzoic acids. It also renders the syrup slightly alkaline and, therefore, incompatible with alkaloidal salts.

The third and fourth formulæ, though perhaps a slight improvement on the first, are still open to the objection of employing too much heat. For the fourth process the advantage is claimed that the sugar aids solution of the aromatic principles, but it is open to the objection that a strong syrup is very difficult to filter bright.

¹ Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Wednesday, March 16.

In addition to the above formulæ it appears to be a very common practice to use one or other of the many concentrated liquors which are added to simple syrup in the proportion of 1 to 4. It is impossible to have a syrup answering to the official specific gravity by this method, and, so far as I have seen, the syrups so made are either very deficient in flavor, or possess a flavor other than the correct one.

It had often occurred to me that the balsam might be sufficiently exhausted by cold maceration, if the tolu was in a fine state of division, and the syrup completed without the application of heat; and the following is the result of a few experiments by way of putting this idea to the proof. I proceeded as follows:—

Take of—

Balsam of tolu.....	1½ oz.
Finest loaf sugar.....	2 lbs.
Water.....	16 ozs.

Reduce the balsam to powder by trituration with 8 ozs. of the sugar. Place them in a bottle with the water, and macerate for forty-eight hours with occasional agitation. Then filter through paper till bright, and dissolve the remainder of the sugar in the filtrate. This is best done by crushing (not powdering) the sugar, placing it in a percolator and passing the filtrate through. The result is a clear and very full flavored syrup, which I think compares favorably with the product of any other published formula. It takes slow percolation to dissolve all the sugar unless the percolator is placed in a moderately warm place, but it might be worth considering whether so large a proportion of sugar is necessary. It is also a little difficult to completely clarify the syrup, and any suggestion in that direction would be an improvement.—*Phar. Jour. and Trans.*, March 26, 1887., p. 785.

BLAUD'S PILLS.¹

By W. DUNCAN.

Three months ago the query, "What is the best method for making Blaud's Pills?" was put to me at one of the meetings of our Association, and knowing that great diversity of opinion exists among us as to the "best" method of preparing the same, I thought the subject a very suitable one for a short paper. Having procured

¹ Read before the Edinburgh Chemists' Assistants' Association. Reprinted from *Phar. Jour. and Trans.*, March 19, 1887, p. 775.

in all nine samples of the pills, I estimated the amount of iron present in the ferrous state, calculating it as carbonate.

A contained.....	14.9	per cent.	FeCO_3
B "	14.25	"	"
C "	22.0	"	"
D "	19.49	"	"
E "	20.1	"	"
F "	15.4	"	"
G "	9.9	"	"
H "	14.5	"	"
I "	10.0	"	"

These samples, with the exception of G and I, were to all outward appearance passable pills, although some would have been greatly improved if a little more care had been taken in rounding them off with the pill finisher. G and I fell to powder when pressed between the fingers. C and E must have been made with dried sulphate of iron, as the theoretical percentage of FeCO_3 in a mass made with 50 per cent. $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$, the usual strength, is only 20.8 per cent., providing no oxidation has taken place, a thing which is absolutely impossible if you attempt to form the ferrous carbonate in the mortar. Of course I am perfectly aware that many pharmacists believe the proper course to adopt in making Blaud's Pills is to hinder chemical action as much as possible, trusting to the reaction taking place in the stomach while the pill is being disintegrated; but I do not think that was the intention of the originator of these pills, neither do I think the majority of us follow out that idea in preparing them. We have no right to take for granted that FeCO_3 is formed in the stomach, while we all can see for ourselves that it is in the mortar. Inquiries at the various shops where I was supplied with specimens elicited the following amusing differences of opinion regarding their preparation. One gentleman tells me he dries separately the iron sulphate and potass. carbonate, mixes the iron with one-sixteenth of its weight of tragacanth, adds the potass. salt and beats into a mass with treacle. His intention is to prevent chemical action between the salts as much as possible.

Another dissolves 2 oz. FeSO_4 in hot water, and the same quantity of K_2CO_3 , mixes the solutions and evaporates to dryness, making up to 4 oz. with equal weights of pulv. acacia and liquorice. They are then massed with glycerin and syrup. This

process I believe yields the minimum of FeCO_3 . Still the pills seem to be as good medicinally, and no fault has been found either by prescribers or patients. As a matter of fact, Mr. Hill tells me he has known of pills which contained not a trace of ferrous iron, and yet were said to act as rapidly on the system as the others. Another gentleman takes $1\frac{1}{2}$ oz. dried FeSO_4 and the same quantity of K_2CO_3 , mixes them, adding 1 oz. pulv. acacia, and beats into a mass with simple syrup, cutting into four-grain pills. After standing for some time to harden, he varnishes them with solution of tolu in ether. They are certainly beautiful pills to all outward appearance; but here again he believes the stomach to be the proper place for the chemical reaction between the salts, not the mortar. He has great faith in his own method, and tells me that a customer of his who had gone to the south of England asked her chemist there to send to Edinburgh for A.'s compressed Blaud's Pills. Others either made them by Martindale's or Ince's formula; two I think by simply rubbing the two salts together, and adding tragacanth q. s. to the liquid mass to give it a proper consistency.

Wishing to test the keeping properties of pills made by the methods followed, I made two dozen each from Mr. Ince's formula, Mr. Martindale's and the old way above described. All were made the same night, and estimated with $\text{K}_2\text{Cr}_2\text{O}_7$, using sulphuric acid as a solvent, and checking the results by duplicate estimations, using H_3PO_4 as a solvent to avoid the action of the sugar influencing the conversion of the ferrous to ferric salt. As a matter of fact, the difference between the four estimations was very slight (two with H_2SO_4 and two with H_3PO_4). The following is Mr. Ince's method:

R 1	{ Ferric sulph.....	3 ss.
	{ Glycerin (hydrated).....	℥ij.
2	{ Potass. carb.....	3 ss.
	{ Glycerin.....	℥ij.

Mix 1 and 2 separately on a slab with glycerin, then mix together in the mortar, add p. tragacanth, gr. vj, and divide into twelve pills. In this formula K_2CO_3 is very much in excess of what is actually necessary for the conversion of the FeSO_4 into FeCO_3 , the 30 grains $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ requiring only 16 grains of anhydrous K_2CO_3 , equal to about 20 grains of the B. P. salt, which contains 16 per cent. H_2O . Mr. Martindale says that a pill made with equal quantities of the two

salts will be sure to deliquesce, and in the "Extra Pharmacopœia" recommends the following improved formula :

R Ferri sulph.....	2½ grs.
Potass. carb.....	1½ grs.
Sacchar.....	1 gr.
Pulv. trag.....	⅓ gr.

I also made two dozen by Martindale's formula, but used a little glycerin to rub up the salts, as in Ince's.

The following are the percentages of FeCO_3 in the fresh pills :

	FeCO_3 per cent.
No. 1 (Ince's formula).....	17.9
" 2 (Martindale's).....	17.0
" 3 (Martindale's formula, but Ince's mod.).....	19.5
" 4 (with tragacanth only).....	16.5

These four sets were laid aside in ordinary chip boxes for two months, the boxes during that time being occasionally opened. They were then carefully examined and estimated. No. 1 (Ince's) were quite hard, and seemed as good as the day they were made.

No. 2 (Martindale's) were very slightly marked with damp-looking patches, the pill powder (pulv. amylic. 5 per cent. trag.) being slightly caked on them.

No. 3 were very soft, and altogether unsightly from absorption of moisture, although the glycerin used in them was hydrated, as recommended as not being hygroscopic.

No. 4 were quite dry and round, but fell to powder when pressed between the fingers.

On being estimated—

No. 1 contained.....	13.73	per cent. FeCO_3
" 2 "	18.3	" "
" 3 "	18.8	" "
" 4 "	11.7	" "

One pharmacist tells me he had the same difficulty with the pills made from Martindale's formula, namely, sweating, and suggested sugar of milk to be used in place of cane sugar. This, I find, is an improvement only in appearance, for on estimating pills in which the same quantity of iron was used to begin with, and which had been kept a month, I found that they only contained 12.2 per cent. FeCO_3 .

From these experiments I have come to the conclusion that Martindale's formula is the one that should be adopted by those of us who

believe Bland's Pills should be really a preparation of FeCO_3 , and not a preparation of FeSO_4 , intended to form the carbonate in the stomach under the assumption that the same reaction goes on in that place as in a glass measure. Their tendency to sweat would be overcome, I think, by varnishing them in tolu and ether, although I have not had time to test the value of that suggestion. Is not this a subject suitable for the B. P. C. Formulary Committee to take under their consideration, and give us an official formula, if not a B. P. one?

NOTE BY THE EDITOR.—A formula similar to that of Mr. Martindale's was published in AM. JOUR. PHARM., 1871, p. 307. For other formulas consult this JOURNAL, 1871, pp. 373 and 471; 1872, pp. 12 and 282; 1876, p. 492; 1880, p. 87; 1882, p. 39; 1883, p. 141; 1885, p. 595.

PRACTICAL REMARKS ON PEARL-COATING OF PILLS.¹

BY WILLIAM GILMOUR.

Pearl-coating has developed to a most extraordinary extent within the past few years, and at the present time is fast revolutionizing the pill-making department of the pharmacist's work. I am very sorry for this, for I quite foresee that in allowing this department to pass into the hands of large manufacturers we are fast drifting on to another rock not less serious than the patent medicine one. This subject is too acute for me to dwell upon at the present time, but let me point out in justification of what I have hinted at that while it is highly improbable that grocers and general dealers will be at the trouble and expense (even were it legal) to buy, spell out and consult the Pharmacopœia for the purpose of making pills, and afterwards coating them, there is nothing remotely improbable in them buying from the wholesale manufacturers, and successfully competing with the more highly educated pharmacist. I do not want to make more of this point than is necessary. It is only because I see clearly both the weakness and strength of our position, and in the hope of strengthening our weakness that I refer to it at all.

The first thing that I would notice in pearl-coating is that it in-

¹ Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Wednesday, March 16.

volves a new departure from the modern tendency and spirit of the Pharmacopœia. Every recent change in the formulæ for "pilulæ" has been in the direction of producing a mass at once firm and plastic, and which would at the same time prevent the pills from getting too hard on keeping. Now the only element of success in pearl-coating, so far as my experience goes, is to have a hard dry pill to begin with. Beyond this and a little common sense to adapt quantities, and a little muscular exertion, there is nothing about the process which a child could not perform. But notice how the condition of hardness and dryness just mentioned agrees with the officinal formulæ. In the Pharmacopœia, there are in all, I think, twenty-one different "pilulæ," and of these fully one half contain ingredients which are utterly incompatible with pearl-coating. There are, for example, seven different masses made with such hygroscopic substances as glycerin and treacle; there are other four containing essential oils and other elements equally unworkable, and I venture to say that no human ingenuity will pearl-coat the pills made from such masses, and at the same time adhere both to the letter and spirit of the Pharmacopœia. But if Mahomet does not go to the mountain, the mountain must go to Mahomet, and so the difficulty has been bridged over—But how?

A second point which I would notice is the amount of French chalk required in this process. From a series of experiments which I have made, I find the amount required ranges from twenty to thirty per cent. of the weight of the pills coated. This makes a considerable increase both in the size and weight of the old 5 grain pill, and suggests, by the way, an increase in the size of the pill boxes in general use. It is not for me to say what the physiological effects of fifteen or twenty grains of an insoluble silicate per day may be on the human economy, particularly if continued for a length of time, as in the case of Bland's pills, but it at least suggests the careful examination of the chalk used, in case of its contamination with any deleterious substance. This large amount of chalk may be increased at pleasure. If the liquid with which the pills are damped be too thick, or if too much be added, more chalk will be required, and the pills will be heavier and larger. Even ten per cent. of an increase by weight of chalk is not a bad profit were we to sell the pills by weight, but as we only retail them by number the hint is probably thrown away.

The three great difficulties which pharmacists will, however, probably require to face as regards successful pearl-coating, are "pitting," "fall-

ing" and "discoloration," and to each of these a word. I have made a distinction between pitting and falling, as I look upon them as different troubles proceeding from distinct causes. Pitting gives the pills all the appearance of dried peas, while falling simply flattens them on the point of the rest. Pitting in its worst form, I think, occurs in the compound colocynth pill, and therefore it may be taken as typical. It is generally ascribed to the resin of scammony, and, certainly, since the resin has been substituted for scammony the evil has increased. Still, other pills containing no resin of scammony undoubtedly pit also, and, therefore, I am inclined to look upon it more as an aggravating cause. As a rule, it will be found that all pills containing aloes, resins or gum resins in excess have a tendency under certain circumstances to pit. What are these circumstances? A theory was given me the other day which I may here throw out, although I have had no opportunity of verifying it. If the essential oil be added to the resin of scammony (reverting to the colocynth pill) before all the ingredients forming the mass are mixed—in other words, if the ingredients are thrown separately into a mortar and the oil of cloves added before mixing, the probability is that the oil might come in direct contact with the resin, and would, in some way, act upon it so as to change its physical properties, and prevent it again immediately hardening. There is this to support the theory, that even with the same ingredients the mass at different times exhibits different properties directly affecting the pill. This, in my experience, applies not only to the colocynth pill mass, but to others, also, which pit more or less on keeping. A soft aloes or a soft resin or gum to begin with, and an overworking of the mass, either with the pestle or the hands, produce very much the same results. In the case of the colocynth pill, if soap is substituted for sulphate of potash the tendency to pit is greatly lessened. I am no advocate for tampering with officinal formulæ, but sulphate of potash is really not required in the present pill, while soap, to my mind, is in every way an improvement.

Add to this suggestion a little care in securing hard dry aloes and resin of scammony, and also in forming a mass neither too hard nor too soft, and the trouble should be reduced to a minimum.

Falling will occur in almost any pill if made too soft, but I refer at present to falling from one peculiar cause, not generally noticed, namely friction. If you want a colocynth pill that will fall, use the rounder or finisher with all your might. Pills that require to be coated, re-

quire to be dry and hard. Of course they are rounded from time to time, each time probably as they get harder with increased friction, and so the mischief is done. In a short time the pills assume all forms as if they were not on good terms with each other. I have always attributed the peculiarity to the heat produced by the friction, and the cure is a little more care in finishing, so as not to require too much of the rounder, and a little attention to frequent shaking during the process of drying.

Discoloration however, is probably the most fertile cause of annoyance to be met with in pearl-coating, and as you know the predisposing causes to discoloration, I need not dwell upon them. As I have already said, I am no advocate for substitution in officinal formulæ, but the difficulty must be bridged over. Fortunately it is here if anywhere that the pharmacist stands strongest. He does not require to stock his pills for twelve months, or even for six months. He has only to stick to the proper formulæ, dry them in the usual manner, coat them, and see how long they will keep, and prepare his stock accordingly. This is troublesome. Of course it is, but we need not expect to get any great good in this world without trouble. I would much prefer myself to mass comp. rhubarb pill with water rather than glycerin, and do many other things not directed in the Pharmacopœia, but I do not see any change which I can make in this direction that would not in the end be to my own prejudice. I know some laugh at the idea of pills losing any of their active properties by the process of hardening, but I have proofs too abundant to doubt the fact for one moment. In the majority of cases the loss may not be noticed, but take an active cathartic pill such as the colocynth, and its action is not only greatly retarded, but also very much impaired.

The drying of pills must always be looked upon as one of the most important parts of the process. I have tried various plans, but have always come back to the old plan of drying on trays in a dry room.

The pills are ready for coating whenever thoroughly dry on the outer surface, and while still a little soft towards the centre. In this state they will not keep long, but they will retain their maximum of activity.

In connection with the subject, I may mention that a gentleman, I believe known to you all (Mr. W. L. Howie), the ²end of last year worked out a process of giving to pearl-coated pills ²the character and sweetness of sugar by the use of Fahlberg's coal tar saccharin. I have

seen some of the pills coated in this way, and from the great sweetening power of saccharin it seems admirably adapted for this purpose. Mr. Howie, I must tell you in case any one should be too enterprising, has patented his process, and I understand the patent covers the use of saccharin in all descriptions of coated pills as well as capsules.

I had intended to touch upon the coating of some extra-pharmacopœia pills, such as "Blaud's," but I am afraid I have already extended my remarks to too great a length. You will quite understand from the current of my remarks that I am not altogether in favor of pearl-coating. They may give you the necessary impression that I am more averse to the process than I really am. It has its objections, and these I have tried to put before you. It has one other characteristic still, namely, that it makes a good made pill look much better, and a bad made pill look much worse, and this last feature I look upon as the most important, seeing that there should not be such a thing as a bad made pill put out of our hands.—*Phar. Jour. and Trans.*, March 26, 1887., p. 781.

A NOTE ON COMMERCIAL HYPOPHOSPHOROUS ACID.¹

BY GEORGE LUNAN.

Solution of hydrogen hypophosphite or hypophosphorous acid is not an official substance, but the inclusion of the calcic and sodic salts in the Pharmacopœia and the prominent place which it occupies in published formulæ for the preparation of compound syrups of the hypophosphites warrant its being included in the category of officinal preparations. The acid, although containing three hydrogen atoms in the molecule, is monobasic, only one of these being replaceable by metallic bases, and as a consequence the formula is always written HPH_2O_2 and not H_3PO_2 .

It is the least oxygenated phosphorus acid, containing one atom less oxygen than phosphorous acid, and two less than phosphoric, in the molecule.

Procter in 1858 recommended for its preparation the decomposition of 480 grains of the calcic salt by 350 grains of crystallized oxalic acid, making saturated solutions of each; mixing, filtering and evaporating the filtrate to eight and a half fluidounces, when the solution would contain 10 per cent. of the acid.

¹ Read before the Edinburgh Chemists' Assistants Association, reprinted from *Phar. Jour. and Trans.*, March 19, 1887, p. 773.

In Parrish's "Pharmacy" this formula is reproduced in detail, 350 grains or a sufficiency of crystallized oxalic acid being specified. Attfield, in his latest edition, says "it may be prepared by decomposing the calcium salt by oxalic acid, or, better, the pure barium salt with sulphuric acid."

Watts' "Inorganic Chemistry" recommends the decomposition of the baric or calcic salts with sulphuric acid, and Watts' "Dictionary of Chemistry," the baric salt with sulphuric acid, or the plumbic salt with sulphydric acid.

It will thus be seen that there is a variety of methods for the preparation of hypophosphorous acid. Commercially, however, the method recommended originally by Procter is the one, I think, in general use. At least, if any reliance can be placed on the result of the experiments about to be summarized, this would seem to be a logical conclusion, as both calcium and the oxalic radicle were proved to be present in every sample examined.

As the solution that suggested this note was evidently much stronger in acid than would result from its preparation by Procter's formula, I resolved to obtain supplies from different sources, merely asking for hypophosphorous acid, without demanding a certain percentage, and in that way making comparisons, with regard to their strength and impurities, of which something had been foreshadowed by the original solution. In attempting to deal with these samples as types of the acid of commerce, I wish to preface the communication of the results by stating that I am well aware that there is such a thing as medicinal purity comparable to chemical. To be more explicit, that economic considerations are as worthy of practical application by manufacturing chemists as by others, and that it is unnecessary to free a commercial drug from a non-injurious impurity contained only in small quantity at the cost of doubling the price of manufacture.

Samples A and B were obtained from wholesale drug houses of first-class repute.

C was prepared by myself, using 12.6 grams of pure recrystallized oxalic acid, and instead of 17 grams of pure calcic hypophosphite as the molecular weight would require .5 gram more (so as to insure, if possible, the absence of oxalic acid in the resulting solution), dissolving separately, mixing, filtering, washing and evaporating the fluid until it weighed 132 grams, when it should have contained 10 per cent. of the acid.

D was a sample kindly furnished me by a retail pharmacist in town. The time at my disposal would not admit of an examination of more, but I believe the above are typical of the commercial article.

The tests to which each sample was subjected, were ;

1st. A solution of calcic acetate containing excess of acetic acid to detect oxalic acid or other oxalates.

2nd. A solution of ammonium oxalate to detect calcium salts.

3rd. A solution of plumbic acetate containing excess of acetic acid to detect phosphorous acid, or other phosphites.

I relied on the last test, from the fact stated in Watts' "Dictionary of Chemistry," that phosphite of lead is insoluble in acetic acid.

As these were likely impurities from the known methods of preparation, more attention was devoted to them than others.

In making qualitative estimations, the *modus operandi* consisted in adding to a small quantity of the sample the calcic acetate solution. In none of them was there an immediate precipitate, but on gently heating, or by merely stirring, a characteristic one began to appear in every sample more or less abundantly.

The ammonium oxalate reagent at once produced a precipitate in them all, and, as this seemed to indicate that the oxalic radicle was contained as calcium salt dissolved by the acid, each solution was neutralized by AmHO , and filtered from the precipitate, which formed in every case, care being taken to use a sufficiently diluted solution. The precipitate was examined, and found to consist of calcium oxalate in every case.

The filtrate was tested for the oxalic radicle in the usual way, and for calcium.

The oxalic radicle being absent, the filtrate was tested after an excess of acetic acid had been added by the acetate of lead reagent.

Of other impurities there were none likely and none found in sufficient quantity to warrant notice.

The results are tabulated below :—

Sample.	CaC_2O_4	Excess of oxalic acid.	Excess of $\text{Ca}_2\text{PH}_2\text{O}_2$	H_3PO_3
A .	Abundant	Absent	Abundant	Absent
B .	Present	Absent	Present	Trace
C .	Present	Absent	Abundant	Absent
D .	Present	Absent	Present	Absent

Comment or inference from these will be left over until the quantitative analyses have been stated. The specific gravities were taken

at 60° F. The neutralizing power, not a very reliable test with a readily oxidized acid like hypophosphorous acid, was determined by a quarter normal solution of NaHO, using methyl orange as an indicator.

Ten cc. of the samples were diluted to 500 cc. with distilled water. Ten cc. of the $\frac{1}{10}$ th NaHO standard solution, which would contain .10 gram of NaHO equal to neutralizing .165 gram of hypophosphorous acid, were taken, so that the quantity of the diluted sample required to neutralize this contained .165 gram of the acid. In the case of sample A 25 cc. of the 1 in 50 solution were required, which would be equal to .5 cc. of the original sample, the specific gravity of which was 1.332, so that it would weigh .5666 gram, and if that contained .165 gram of acid a rule of three sum decided that the percentage was 29.12. In making these volumetric estimations the ordinary method, that of running the standard solution into the sample, was not followed, it being thought that having the more dilute solution in the burette would give more exact results. Also that the indicator would be altered by remaining for any length of time with an excess of so powerful a reducing acid as hypophosphorous.

Practically, however, both methods yielded similar or very nearly similar results.

As it was thought that the determination of the reducing power of the samples would be a truer criterion, a process easily applied was looked for.

A standardized solution of KMnO_4 would, it was thought, admirably suit the purpose.

Various experiments were then made in the acid solution and neutralized, but after a series of heart-burnings it was found that the process would not work practically.

Though there can be no doubt that the official hypophosphites can be readily and easily determined by this method it must be borne in mind that in these cases known quantities are operated upon, and the end of the reaction can be ascertained only by filtration. The idea of using KMnO_4 was therefore abandoned, and fortunately for me the resources of chemistry were not exhausted. In "Watts' Dictionary of Chemistry" a process founded on the power of hypophosphorous acid of reducing HgCl_2 to HgCl was unearthed. It consists in adding a known quantity of the sample to an excess of mercuric chloride, acidifying with a small quantity of HCl , keeping the solution at a

temperature of 60° C. for some time, then throwing on a tared and dried filter, washing, drying at 100° C., and weighing the calomel. The equation is $\text{H}_3\text{PO}_2 + 4\text{HgCl}_2 + 2\text{H}_2\text{O} = \text{H}_3\text{PO}_4 + 4\text{HgCl} + 4\text{HCl}$. It was specified in the process that the temperature must not exceed 70° C., as in that case some of the calomel might be reduced to the metallic state. Practically, however, it was found that barely one-half of the reducing power of the samples was exhausted by digestion for nearly an hour at 60° C. A quantity of the acid heated to 100° C. with excess of HgCl_2 produced a white precipitate which showed no signs of reduction, either to mercurous oxide or to metallic mercury, and as it was proved that the filtrate could be boiled indefinitely without producing the slightest further precipitation it was deemed that this process would work practically with the alteration of the digestion at 60° C. to heating to the boiling point 100° C.

As an example of this process 20 cc. of a solution of sample (A) containing 10 cc. in 500 cc., which would be equal to .4 cc. of the original solution, weighing (seeing the specific gravity was 1.1332) .45468 gram, was taken; to this was added a known excess of 5 per cent. solution of HgCl_2 , 3 cc. of HCl , and the whole diluted to about 100 cc. with distilled water, and heated to 100° C.

The calomel separated as a lustrous purely white precipitate, which when thrown on a tared filter, well washed and dried, weighed 1.8989 gram.

Now by the equation 942 grams of calomel are produced by 66 grams of H_3PO_2 , so that calculation proved that .45328 gram of the sample contained .133 gram of pure H_3PO_2 which is equal to 29.48 per cent.

The quantitative estimation is tabulated below:—

Sample.	Sp. gr.	Percentage of H_3PO_2	
		NaHO estimation.	Reduction of HgCl_2 to HgCl .
A. . .	1.1332	29.12	28.48
B. . .	1.1367	29.95	29.95
C. . .	1.0442	8.87	8.87
D. . .	1.0353	8.07	8.07

If any reliance can be placed on the qualitative estimations submitted to you, it would seem that the acid cannot be prepared free from calcic oxalate if the lime and oxalic acid process is used for its preparation.

As there cannot be any doubt but that freshly precipitated oxalate

of calcium is to a certain extent soluble in hypophosphorous acid, for I verified this by an experiment, the question arises, "Is the presence of calcic oxalate likely to have any deleterious effects?" Supposing the sample to be required for the preparation of a compound syrup of the hypophosphites containing the calcium salt, it would lead to endless trouble to keep a presentable syrup. Even if it were contained as free oxalic acid it would be more easily got rid of (as it would be all thrown out at once) than by the slow process of precipitation which would go on for months, as in presence of a less acid solution the calcic oxalate slowly separated. If it were required for dispensing purposes it would when diluted gradually deposit its impurity. Again the quantity of impurity introduced into the system would amount to something considerable in time, were the medicine persisted in. In short, the acid is not likely to recommend itself as a mode of exhibiting the hypophosphorous radicle until the commercial article is to be obtained purer. I have never personally come across a sample of the commercial drug that did not deposit more or less after being kept for a week or two.

Mr. A. E. Robinson, in a paper read before the British Pharmaceutical Conference, in 1885, suggested the use of this acid as a preservative agent, for a concentrated solution of ferrous iodide, specifying that care must be taken that the acid should contain no oxalic acid. Then these samples, whether used as a preservative for ferrous iodide, bromide or chloride, would not do. It was thought likely that the more concentrated solution would give evidence of the presence of phosphorous acid, but this was not so, except in one case, and the volumetric and gravimetric estimations taken conjointly confirm this. The high specific gravity of sample C is due to excessive quantity of lime salt it contained. That the neutralizing power of the samples is lower than their reducing power is also borne out by the same fact. The only inquiry suggested by the quantitative estimation is, "Whether a 10 or 30 per cent. sample should be used when acid hypophosphorous is simply ordered?" The quantitative determinations proved one thing, however, which would otherwise have remained a matter of doubt, namely, that phosphorous acid was absent almost entirely from the samples.

This was contrary to my preformed judgment, having thought that at all events the more concentrated solutions would contain appreciable quantities. Had there been another week at my disposal before com-

communicating these notes, I intended preparing a sample of the acid by the barium salt and sulphuric acid process, and submitting it to you with a recommendation. The process which I intended following was to decompose 29.5 grams of the pure barium salt, dissolved in 120 cc. of distilled water, with 10 grams of H_2SO_4 , specific gravity 1.843, filtering, washing to make the filtrate measure about 150 cc., and concentrating until the fluid weighed 65 grams, when it should contain 20 per cent. H_3PO_2 . As I am not certain whether the nascent acid may not render some of the barium sulphate soluble by reducing a quantity of that precipitate to sulphite, I cannot offer the process guaranteed.

Regarding the concentration I feel sure that an acid of 20 per cent. would be suitable for every purpose, and this cannot be said of the weaker, while at the same time it would not be rendered liable to the alteration which further condensation would produce.

I have only, in conclusion, to thank the firm of James Robertson and Co., 35 George Street, for placing samples at my disposal, and for allowing the use of their reagents and apparatus to conduct these experiments. I have particularly to thank Mr. A. A. Lumsden, who has most obligingly rendered me invaluable aid in conducting and verifying the quantitative estimations. Besides he has placed at my disposal his counsel and advice on the whole subject, and backed by his assistance as a technical analytical chemist of many years' experience, I am emboldened to submit these notes to your full and free criticism.

Since reading the above Mr. Boa has drawn my attention to the fact that my results confirm to a considerable extent those arrived at by Mr. Branson, whose published remarks I had not previously seen.

IODOFORM AS AN ANTISEPTIC.

BY CH. HEYN, AND T. ROSVING.

The authors maintain (*Fortsch. d. Med.* January 16, 1887.) that the antiseptic powers of iodoform have been assumed but not proved, and record a series of experiments which have led them to the conclusion that iodoform is not an antiseptic. They affirm that micro-organisms, even when covered with powdered iodoform, grow freely. They inoculated sterilized iodoform jelly with

a series of micro-organisms—pneumococcus, staphylococcus aureus, bacillus subtilis, and a micrococcus from the pus of a rat—and found all growing freely on the third day. Olive oil containing four per cent. of iodoform had no influence on the growth of bacillus subtilis and staphylococcus aureus, either at ordinary temperatures or at blood heat, and both grew after two days in a mixture of equal parts of this oil and calf's serum. In iodoform spray they demonstrated, they think, the presence of numerous micro-organisms; and a plug of iodoform gauze retained in the vagina for two hours, though odorless, was shown by cultivation experiments to contain bacteria.

Heyn and Rosving record a series of experiments on animals, which they assert support their view that iodoform does not possess antiseptic properties. In one case a cultivation of staphylococcus aureus was mixed with iodoform powder, and after ten days injected into the knee joint of a rabbit. Next day the rabbit was evidently ill, and the joint was swollen. On the third day some pus was drawn from the joint, and from this, characteristic pure cultures of staphylococcus aureus were eventually obtained. The Danish observers conclude from their experiments—

(1) That iodoform is valueless in surgery as an antiseptic, even though it may possess other useful properties.

(2) That as iodoform preparations themselves may contain pathogenous micro-organisms, they cannot be used without some danger.

(3) That even though iodoform be pure there is danger in using it, unless care be taken that the apparatus (brushes, sprays, &c.) by which it is applied are free from infective germs, for the iodoform will not kill these. In support of this view they bring forward a case recorded by Lesser, where a brush, with which a soft sore had been painted with iodoform, was applied next day to dust with iodoform a granulating wound, and a soft sore formed on the wound in consequence.

In a recent number of the *Wien. med. Woch.*, the paper of Heyn and Rosving is subjected to criticism which is unnecessarily abusive. The conclusions arrived at as to the uselessness and even danger of iodoform dressing may not be fully warranted by the results of their experiments, but they have done good service by drawing attention to the subject. If their results are confirmed, we must hesitate before accepting some of the clinical inferences which we are apt to draw from experimental work on the destruction of micro-organisms by various agents.—*Med. Chronicle*, March 1887.

ARBUTIN.

UVA URSI leaves contain, in addition to tannic and gallic acids, a bitter glucoside, arbutin, which is white, crystalline, and soluble in water. During the past four years several observers have tried to determine whether arbutin might not, with advantage, be substituted for the various preparations of uva ursi now in use. Lewin, in 1883, (*Virchow's Archiv*, XCII., p. 517,) showed that arbutin splits up, when boiled with dilute sulphuric acid, into hydrochinon, methyl hydrochinon, and sugar, and stated that when administered it is in part decomposed, so that the urine contains besides arbutin a certain amount of hydrochinon. Now hydrochinon is itself an antiseptic and antipyretic, and has been found useful by Brieger as an injection in gonorrhœa. Lewin recommended the substitution of arbutin, in 15 grain doses, for the ordinary preparations of uva ursi. Uva ursi is a reputed diuretic as well as a specific in vesical catarrh. Menche published a paper in 1883 (*Cent. f. kl. Med.*, XXVII., p. 443,) on arbutin as a diuretic, and recorded some cases which served to illustrate its value in cardiac dropsy. Subsequent observations have not confirmed Menche's views on this point. In a few cases of cardiac dropsy, in which the drug was given at the Manchester Infirmary, it proved wholly inefficacious as a diuretic.

Paschkis (*Wien. med. Presse*, 1884, No. 13) obtained no good results from the use of arbutin in several cases of cystitis and gonorrhœa, though he found these ailments markedly improved by uva ursi itself. Either arbutin is not the active curative principle, at least in the doses employed by Paschkis (30 grains daily,) or the preparation he used was not arbutin.

Schmiz (*Cent. f. kl. Med.* No. 49, 1884) found arbutin very useful in some cases of bladder catarrh. He did not see good results follow its use in all cases, but recommends its use in preference to uva ursi itself. Very recently Kunkel (*Münch. med. Woch.*, December 7th, 1886) published his investigations upon the absorption and excretion of arbutin, and has arrived at the conclusion that the greater part is excreted unchanged; a little is decomposed in the intestine, but it is not decomposed, as Menche thought, in its passage through the system. At the present time then the value of arbutin must be regarded as doubtful, and though it may be tried in doses of 10 grains, where ordinary remedies have failed to relieve bladder catarrh, it cannot be used as a reliable remedy. Moreover its price (about eighteen pence a drachm) prevents its extensive use.—*Med. Chronicle*, March 1887.

NOTE BY THE EDITOR, AM. JOUR. PHAR.—In connection with the above, some older observations deserve to be mentioned. Prof. C. D. Schroff states (*Pharmacologie*, 1862, p. 142), that arbutin taken in doses of 0.1, 0.2 and 0.5 gm. did not produce any appreciable result; that the urine was not altered, either in amount or color, and that arbutin could not be detected in the urine. Husemann and Hilger (*Pflanzenstoffe*, 2d edit. p. 1127) report also the results of Jablonowski's experiments, according to which no effect was observed from 20.0 gm. of arbutin taken within 48 hours, and the urine contained neither arbutin nor hydrokinone, but in place thereof benzoic acid and a humin like substance insoluble in alcohol. On the other hand, hydrokinone-sulphonic and methyl-hydrokinone-sulphonic acids were found in the urine by Mering, after arbutin had been taken. In view of these conflicting results is it not likely that the effects of arbutin are materially modified by the presence of other constituents of uva ursi, like ericolin, gallic acid, and the peculiar tannin which is present? The same or closely allied constituents have been shown to exist also in other sempervirent ericaceous leaves, like chimaphila, epigaea, manzanita (*Arctostaphylos glauca*) &c., which are reputed to possess diuretic properties.

PEPTONES IN THE BLOOD AND URINE.

BY GEORGES.

All the methods hitherto proposed for the detection of peptones in urine are more or less defective. The author gives the preference to the two following:—

I. This has been recently employed by Wassermann for the detection of peptones in the blood. The blood is received in strong alcohol; the clot thrown on a filter is washed first with cold then with boiling water; the aqueous solution is concentrated to about double the volume of the blood taken, and then added to the alcoholic solution; sodium acetate and ferric chloride are now added to the liquid. After filtration a cooling, the last traces of albumin are removed by adding potassium ferrocyanide and acetic acid, filtered, the excess of ferrocyanide precipitated by copper acetate, filtered, excess of copper removed by hydrogen sulphide; filtered again, and heated on the water-bath to expel hydrogen sulphide and to concentrate the liquid. This method gives good results, especially if care be taken to neutral-

ize, or even to add any slight excess of alkali on adding the sodi acetate and ferric chloride. It also serves very well for the investigation of peptones in urine, commencing by boiling to precipitate albumin coagulable by heat, and terminating as above.

II. The double iodide of potassium and mercury precipitates albumin and the peptones, and Tanret has shown that the albuminous precipitate is insoluble in boiling acetic acid, whilst the peptone precipitate dissolves completely. Employing these reactions, Georges has established a much more rapid method as follows:—Precipitate by heat all the coagulable albumin; treat the urine with acetic acid and the double iodide, wash the precipitate on a filter with cold water charged with acetic acid to the same extent as the urine; wash again with the same acidified water boiling, keeping the washings apart. The clear liquid obtained gives a precipitate on cooling if the least trace of peptonic precipitate has been dissolved. It is only necessary to neutralize in order to obtain a solution to which the double iodide test can be applied.—*Jour. Chem. Soc.*, Feb. 1887, 188; *Jour. Phar. Chim.* 1886.

PTOMAÏNES.¹

By H. BECKURTS. -

The detection of poisonous alkaloids in forensic and similar cases is greatly increased in difficulty owing to the formation of ptomaïnes from albuminoid substances of animal or vegetable origin, more especially as the ptomaïnes in their general chemical reactions bear great resemblance to the vegetable alkaloids. It has repeatedly occurred in criminal cases, that the two classes of compounds have been confounded, even by experts. All the basic nitrogenous products which result from the action of bacteria, whether of disease or decomposition, must be considered as ptomaïnes; and perhaps also certain definite poisonous basic substances, the leucomaïnes, which according to Gautier are formed during life in man and the higher animals.

Until very recently, only ptomaïnes of unknown composition had been isolated, and in all cases by the methods of Stas-Otto and Dragendorff. It is mainly to Brieger's investigations during the past four years, that we are indebted for a more accurate knowledge of

¹*Arch. Pharm.*, 1886, 1041–1065. Reprinted from *Jour. Chem. Soc.*, April, 1887.

the composition of these compounds. From decomposing flesh, Brieger obtained *neuridine*, $C_5H_{14}N_3$, and *neurine*, $C_5H_{13}NO$. From decomposing fish he obtained a poisonous isomeride of ethylenediamine, possibly *ethylidenediamine*, $C_2H_4(NH_2)_2$, *muscarine*, $C_5H_{15}NO_3$, and the physiologically inactive *gadinine*, $C_6H_{17}NO_2$. Fully decomposed cheese yielded neuridine. Decomposing glue gave neuridine, dimethylamine, and a muscarine-like base, whilst rotten yeast gave *dimethylamine* only. As these compounds result from the action of bacteria on animal tissues, so Brieger showed that the same or analogous compounds were similarly formed in the human subject. In the earlier stages of decomposition, only *choline* was found. After three days, neuridine appeared in increasing amounts, whilst choline gradually disappeared, being replaced by trimethylamine. After fourteen days, neuridine had also disappeared. Later, there most commonly appeared *cadaverine*, $C_5H_{16}N_2$, and *putrescine*, $C_4H_{12}N_2$. With cadaverine is also found a substance of the same composition, called *saprine*, but differing considerably in its reactions. The bases choline, neuridine, cadaverine, putrescine and saprine are physiologically indifferent; but after fourteen days' decomposition a new poisonous base, *mydaleine*, was obtained which seems to be a diamine. In human remains (heart, lung, liver, etc.), maintained at -9 to $+5^\circ$ C. during four months, a new base, *mydine*, $C_8H_{11}NO$, was found, a strongly reducing agent, and a poisonous base, *mydatoxine*, $C_6H_{13}NO_2$, also the poisonous *methyl-guanidine* was isolated. O. Bocklisch, employing Brieger's method, obtained a large number of bases from decomposing fish. The bases so obtained were not poisonous, and attempts to separate the injurious compounds were unsuccessful. The fact that decomposition bacteria induce the formation of numerous basic substances from albuminoid compounds, makes it highly probable that pathogenic bacteria possess similar properties. Thus, Koch, Nicati and Rietsch have found poisonous ptomaines in cholera. In cultivation of typhus bacilla, a strongly basic poison, *typhotoxine*, $C_7H_{17}NO_2$, was obtained; and from tetanus cultivations a strong base, *tetanine*, $C_{13}H_{30}N_2O_4$, was obtained. The bases obtained by Brieger are either liquids of definite boiling point, or solid crystalline substances. The salts show the so-called general alkaloid reactions, so that as a group the ptomaines cannot be separated from the alkaloids. The non-poisonous ptomaines readily give rise to poisonous compounds; thus, cadaverine, which has been shown by Ladenburg to be *pentamethylenediamine*, is con-

verted by rapid distillation of the hydrochloride into the poisonous *piperidine*. Whilst the constitution of cadaverine has just been indicated, putrescine is either a dimethylethylenediamine or methyl-ethyl-methylenediamine; which of the two, further investigation must decide. The present methods of isolating the alkaloids do not yield absolutely certain results, and further extended investigation is required.

Supplementary to the above are the researches of C. Gram (*Chem. Centr.*, 1886, p. 647), who obtained from putrid meat in various conditions of putrefaction by treatment with amylalcohol, bases, which, like their hydrochloric acid derivatives, were perfectly inert, while decidedly poisonous properties were observed in the lactic acid compounds under similar treatment. Similar observations were also made with bases obtained from putrid yeast free from the poisonous *sepsine*. Choline, which is widely distributed throughout animal and vegetable organisms, gives rise to a poisonous substance with muscarine-like action, if heated, in combination with lactic acid.

INOSITE.¹

BY MAQUENNE.

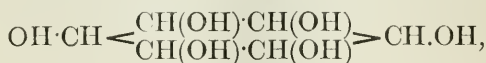
Walnut leaves are extracted methodically with about four times their weight of water, and the boiling solution is precipitated first with milk of lime, then with lead acetate, and finally with basic lead acetate, which forms an insoluble compound with the inosite. The last precipitate is washed with water, decomposed by hydrogen sulphide, and the solution concentrated to a syrup. The boiling liquid is then mixed with 7 or 8 per cent. of concentrated nitric acid, which destroys nearly all the foreign matter without attacking the inosite, and, after cooling, a mixture of 4-5 vols. of alcohol with 1 vol. of ether is gradually added to the nearly colorless liquid. Inosite is thus separated as a colorless flocculent precipitate, which is recrystallized from dilute acetic acid, dissolved in water, again treated with nitric acid, and again precipitated with alcohol and ether. A small quantity of calcium sulphate, which always occurs in the product, is decomposed by adding barium hydroxide, and the barium is removed by means of ammonium carbonate, the product being finally recrystallized from water. The yield is about 2.94 grains per kilo. of leaves.

¹ *Compt. rend.*, 104, p. 225-227. Reprinted from *Jour. Chem. Soc.*, April, 1887.

Anhydrous inosite has the composition $C_6H_{12}O_6$, whilst the crystals have the composition $C_6H_{12}O_6 + 2H_2O$; they lose all their water at 110° . Inosite does not volatilize without decomposition, but its molecular weight can be determined by Raoult's cryoscopic method, that is, by determining the freezing point of its aqueous solution. The freezing point of a solution of 2.5 grams of inosite in 100 grams of water is -0.29° , whilst the calculated value for $C_6H_{12}O_6$ is -0.27° .

Inosite is only slightly soluble in cold, but very soluble in warm water. It is insoluble in alcohol, ether and glacial acetic acid, but dissolves readily in dilute acetic acid, from which it can be easily crystallized. It melts at 217° without carbonization, and boils with slight decomposition in a vacuum at 319° . When heated in the air it burns readily. Solutions of inosite are optically inactive, both when freshly prepared and after they have been in contact with *Penicillium glaucum* for six weeks. Inosite is not attacked by boiling dilute acids or alkalis, does not reduce copper solutions, and is not acted on by ammoniacal silver nitrate alone, but in presence of sodium hydroxide it yields a mirror of metallic silver. It does not combine with sodium hydrogen sulphite, is not reduced by sodium amalgam, and is not sensibly affected by halogens in the cold. When heated with bromine and water at 100° , it yields brown products precipitable by salts of barium and similar to those obtained in Scherer's reaction. These compounds contain no bromine, and are oxidation-products which can be more readily prepared by the action of nitric acid.

No acid containing six carbon-atoms can be obtained from inosite, nor will it split up into oxy-acids of the acetic series. It is neither an aldehyde nor a ketone, and contains neither double bonds nor lateral chains; hence, it can only be a hexhydric hexa-secondary alcohol, with a constitution represented by the symbol—



which agrees with its optical inactivity.

ACTION OF SALIVA ON STARCH. ¹

By E. BOURQUELOT.

Potato starch, free from glucose, was heated with water to a definite temperature, cooled down to the ordinary temperature, and then mixed

¹ *Compt. rend.*, 104, pp. 71-74 and pp. 177-180. Reprinted from *Jour. Chem. Soc.*, April, 1887.

with saliva. When fermentation was complete, the reducing power of the liquid was determined by means of Fehling's solution. The saliva acts only on the starch which has undergone hydration, and it was found that the hydrating action of water begins at about 52° , and increases somewhat irregularly up to 74° , beyond which point an increased temperature exerts no sensible effect.

In a second series of experiments, the water and saliva were mixed together, heated up to a definite temperature, the starch added, the temperature maintained for about $3\frac{1}{2}$ hours, and the reducing power of the liquid was then determined. The results show that saliva acts on starch at a temperature below that which water alone exerts any hydrating action. Feebly acid or alkaline liquids, or solutions of sodium chloride or phosphate have no action on amylose at temperatures below 53° , and saliva in which the ferment has been destroyed by boiling is scarcely more active. It follows that it is the diastase in the saliva which assists the hydrating action of the water.

At the temperature at which water alone begins to convert starch into a hydrate saccharifiable by saliva at the ordinary temperature, water mixed with saliva has a more energetic action than when water and saliva are allowed to act successively in the way described. The difference diminishes, however, as the temperature approaches 58° , at which point the two actions are equal. At higher temperatures the action is greater if the water alone is heated, and the saliva is afterwards added to the cooled liquid, than when the saliva and water are heated together, since the high temperature destroys the diastase in the saliva.

Potato starch was heated with saliva and water at different temperatures for different periods of time. At temperatures below 57° , the amount of reduction increases with the temperature and also with the time, but is not proportional to the latter. At temperatures above 57° , however, the action continues to increase with the temperature, but attains its maximum in about five hours, and proceeds very little further even if the experiment is prolonged to thirty hours.

The hydrating action of water alone increases with the temperature, and is practically complete after five hours, increasing but little if the experiment is continued for thirty hours. The hydrating action of the water is independent of the mass of the water.

It is a general rule that a reaction effected on a single carbon compound is proportional to, or in direct relation to, the time, especially if the action is of the nature of hydration. The divergence from this rule observed in the case of starch and water indicates that starch granules are composed of a complex mixture of carbohydrates, and not only of one or two compounds (glucose and amylose). Possibly these different compounds are polymerides of one original substance. This view is similar to that held by many physiologists concerning the different layers of cellulose which constitute cell-walls.

BAHAMA SPONGES.

By E. M. HOLMES, F. L. S.,

Curator of the Museum of the Pharmaceutical Society.

In the Bahama Court of the late Colonial and Indian Exhibition a fine series of the different commercial varieties of West India sponges was exhibited, and since its close a typical specimen of each of them has been presented to the Museum of the Pharmaceutical Society. During the last few years sponges have formed an article of considerable import from the Bahamas to this country, and a description of the different kinds met with in commerce may therefore be found useful for reference. In order to make clear the features in which the several commercial varieties differ, it will be necessary to refer briefly to the structure of these animals in a living state.

By zoologists sponges are classed as an order of the sub-kingdom Protozoa, the leading feature of which is that the animals included in the order consist of a composite mass or colony of small amœboid particles of gelatinous matter, supported by a skeleton, which consists either of a network of horny fibres or of calcareous or silicious spicules.†

Consequently in the fresh state sponges present an appearance exceedingly different to that with which we are familiar, forming dark, unsightly masses of jelly, and it is only when the sarcode or gelatinous matter is removed that the skeleton, known as the sponge of commerce, becomes visible. In the living animal the surface presents a large number of minute orifices or "pores," and a few much larger ones, known as "oscles," or excurrent apertures. Both of

† Of the last-named, the pretty "Venus flower-basket" (*Euplectella Aspergillum*) and the glass rope sponge (*Hyalonema mirabile*) are instances.

these can be closed at the will of the animal. A current of water carrying food to the animal enters through the smaller openings, and is subsequently ejected through the larger openings or oscules. This current is set up by means of specially ciliated sponge particles contained in cavities below the surface of the sponge, the cilia waving in one direction only, like those of the mucous membrane of the lungs in higher animals; the ordinary particles of the sponge flesh possessing no cilia, but having only an amœboid movement. The openings in the gelatinous surface correspond to the openings visible in the horny skeleton, and it is by the character and the arrangement of these, as well as by that of the fibres, that sponges are classified both commercially and scientifically.

Until the discovery of sponges in the Bahamas and in the vicinity of Florida, all the sponges of commerce were derived from the eastern half of the Mediterranean sea, which still supplies the finest qualities. A great number of varieties, both in form and relative degrees of softness or hardness, are recognized; one London sponge merchant even asserting that there are as many as four hundred Mediterranean kinds. These varieties, whether of European or American origin, are referred by zoologists to three principal types:—

1. *Spongia officinalis*, L., which is the source of the Turkey cup sponge.
2. *Spongia agaricina*, Schmidt, affording a cup sponge of harder and more unyielding texture than the Turkey cup and known as the Zimocca sponge.
3. *Spongia equina*, Schmidt, yielding the bath or honeycomb sponge.

The first, according to Mr. Saville Kent,* is distinguished by its usually cup-shaped contour, by the exceedingly fine elastic and densely interwoven fibres of which it is composed, and by the oscules being more crowded towards the centre of the cup.

The second, or Zimocca sponge, is recognized at sight from the Turkey cup sponge—which it closely resembles in shape, although the cups are flatter and more saucer-shaped—by the fact that the larger openings, instead of being crowded towards the centre of the cup, are uniformly scattered at nearly regular distances over its whole upper surface, and by being much harder and more unyielding to the

* "Report on the Sponges of the Bahama Islands," by W. Saville Kent, p. 407, in 'Fisheries Exhibition Literature,' vol. v., part ii.

touch. The fibres are closely interwoven, as in the Turkey kind, but are coarser and less elastic. It is only one-third the value of Turkey sponge.

The third, or honeycomb sponge, has a more spheroidal or rounded form, flattened above, and the larger or excurrent openings are irregularly scattered over the upper surface. In this kind the erect or primary fibres are not visible.

The Bahama sponges correspond closely with the typical forms above described in general characters, and by Mr. A. Hyatt,† the American spongologist, are considered to be varieties of these species. He expresses the opinion, however, that the coarser varieties of the European sponges are finer, firmer, and more elastic than the finest of the corresponding American sub-species, the inferiority of the latter being attributed to the large amount of foreign matter included in their primary fibres, the looser mesh of the fibres, which are comparatively coarse, and the larger and more numerous canals.

The Bahama sponges are referable, according to Mr. Hyatt, to the following sub-species:—

Reef, or glove sponge, to *Spongia officinalis*, var. *tubulifera*.

Sheeps' wool sponge, to *Spongia equina*, var. *gossypina*.

Abaco velvet and cay velvet sponge, to *Spongia equina*, var. *mean-driniformis*.

Grass sponge, to *Spongia equina*, var. *cerebriformis*, and *Spongia graminea*.

Hardhead sponge, to *Spongia agaricina*, var. *typica*.

Yellow sponge, to *Spongia agaricina*, vars. *corlosia*, *dura* and *punctata*.

Reef, or Glove Sponge.—Although resembling Turkey sponge in the closeness of its mesh it is quite different in shape, being broadest at the base and convex or dome-shaped above, and sometimes compressed laterally. The oscules are fewer in number, rather large, and are often situated in a row opening on the top of the sponge. The texture becomes very brittle with age and is never so elastic as the Turkey sponge; being very soft and much cheaper than the latter (only about one-tenth its value), it answers very well for surgical purposes where it is necessary to renew the sponges frequently.

The glove sponges, as a rule, are of comparatively small size. They grow gregariously on a hard bottom or on reefs, five or six feet below

† 'Revision of the North American Porifera,' Boston Soc. Nat. Hist., 1876.

the surface of the water, and sometimes are irregular or dendritic in shape, and are then much less valuable. Those known as reef sponges are similar in shape to the glove sponge, but are rather harder, and have the oscules more regularly distributed over the surface. Old specimens become very brittle and are easily torn. A third kind, scarcely distinguishable from the glove sponge by the eye, but harder even than the reef sponge to the touch, is described as a "hardhead" sponge.

Sheeps' Wool.—This variety corresponds most nearly with the honeycomb sponge of the Mediterranean, and is, indeed, an American variety of that sponge. It derives its name from the fact that the fibres of the external surface are developed in the form of little pointed tufts, which give the sponge a peculiar fleecy appearance. In its sub-spheroidal shape it resembles the Mediterranean honeycomb sponge; the larger apertures are distributed with comparative regularity over the upper surface, the fleecy tufts sometimes projecting and converging over the openings; the inner substance is honeycombed with tortuous channels. This sponge is soft to the touch and is suitable for bath and toilet use, but is only one-half the price of the Mediterranean honeycomb sponge. It is found at depths varying from three to sixteen feet or more, the finest in size and fibre being found at the greatest depth. A sponge very similar in appearance to the sheeps' wool, but much harder to the touch, is met with, which is classed as a "hardhead" sponge.

Abaco Velvet or Boat Sponge.—This sponge bears a general resemblance to the sheeps' wool in shape and size, but the superficial tufts of fibres stand out more distinctly and are more obtuse and somewhat broader. The most marked feature consists in the oscules being crowded in the centre of the sponge and there uniting to form one or more rarely two, large openings which much depreciate its value. If the opening is closed by passing a thread round it and then drawing the sides of the aperture together the sponge will last much longer. In texture it is as soft as the sheeps' wool; it is quite suitable for toilet use, where a cheap sponge is required, and is about 25 per cent. cheaper than the sheeps' wool.

Cay Velvet.—This sponge is a harder variety of the Abaco velvet, being much more resistant to the touch. It presents in a still more marked manner than that sponge the peculiar appearance like brain coral (*Meandrina*) which characterizes the velvet sponges. It is chiefly used by painters and for stables and domestic cleaning purposes.

Grass Sponge.—This is a soft sponge, rounded or oblong in outline, with the oscules crowded together on the upper surface, each oscule being generally surmounted by a short thin projecting tube of sponge fibre, which has a longitudinally striated appearance, quite characteristic of this sponge. Occasionally there are a few large openings at the side. Another very noticeable feature in this variety is that the projecting tufts of fibres are very slender and appear to be arranged in a somewhat regular manner in perpendicular lines, which, extending to the upper surface, gives it a singularly radiate appearance. Although very soft and elastic, the grass sponge is easily torn, owing to the looseness of its fibre. It is quite soft enough for toilet use, and is only about one-third the price of the sheeps' wool sponge.

Another form of the grass sponge is described by Mr. Hyatt under the name of *Spongia graminea*, and included by him under the grass sponges; it has a coarser texture and the internal tissue is very open, owing to the large size and central position of the larger openings. It usually has the shape of a truncated cone, and is fluted on the side with deep furrows, the truncated apex being either flat or funnel-shaped and the oscules appearing on the truncated apex. It is a gregarious form, growing only three feet below the surface of the water.

Hardhead.—The sponges that pass under this name do not form a distinct kind, but the term is applied to hard varieties of the above sponges; thus there is a hard-head glove and a hardhead sheeps' wool. The former appears to bear the same relation to the glove or reef sponge that the Zimocca does to the Turkey cup sponge.

Yellow.—This sponge is the coarsest and hardest of all the Bahama sponges. It presents a dome-like shape and exhibits on the upper surface a few, often slightly projecting oscules, which are large enough to admit the little finger. The superficial tufts of fibre have a branched appearance with finely fringed ends. To the touch the sponge is quite tough and hard, yielding only to considerable pressure, and its texture is brittle. It is fit for stable use or where a coarse sponge only is required, and is only about one-tenth the price of honeycomb sponge.—*Phar. Jour. and Trans.*, March 19, 1887. p. 761.

GLEANINGS IN MATERIA MEDICA.

BY THE EDITOR.

Asparagin is levorotatory and its crystals have left-handed hemihedral faces. A. Piutti (*Compt. Rend.*, vol. 103, p. 134) has obtained from the mother-liquor of crude asparagin an isomeride with right-handed crystals and dextrorotatory power, and of a much sweeter taste. The derivatives of the two varieties of asparagin are chemically identical, but differ optically, and the two aspartic acids combine in equal proportions to asparagenic acid, which is inactive and gives monoclinic crystals.

Smilax glycyphylla.—Prof. E. H. Rennie, of Adelaide, South Australia, has further examined the *glycyphyllin* described in 1881 (*AM. JOUR. PHAR.*, 1881, 237). The ethereal extract of the alcoholic extract of the leaves was repeatedly crystallized from hot water containing a very small quantity of water, and the last traces of coloring matter were removed by quickly shaking up the warm aqueous solution, cooled down to beginning crystallization, with ether and filtering the ethereal solution, or by precipitating the coloring matter from the hot aqueous solution by lead acetate, treating the filtrate with H_2S and again filtering. The principle has the composition $C_{21}H_{24}O_{29}$ and crystallizes from water with $4\frac{1}{2}$ aq., and from aqueous ether with 3 aq. It is insoluble in chloroform, benzene and petroleum benzin, somewhat soluble in ether, freely soluble in hot water, and very sparingly soluble in cold water, but imparting to it its peculiar liquorice-like taste. The solution is precipitated by basic lead acetate, but not by the normal acetate. The solution in alkali becomes red brown on exposure. On boiling with dilute sulphuric acid the principle is decomposed into *isodulcitol* $C_6H_{14}O_6$ (melting point $93-94^\circ C.$), and *phloretin* $C_{15}H_{14}O_5$ (melting point $250^\circ C.$); the latter, on being boiled with potassa, yielded phloroglucol $C_6H_6O_3$ (melting at 208°), and phloretic acid $C_9H_{10}O_3$ (melting at 127°). The theoretical yield, according to the above formulas, is phloretin 65.22 and isodulcitol 43.33 per cent.; by experiment, 65.01 to 66.31 per cent. of the former and 42.2 per cent. of the latter were obtained.—*Jour. Chem. Soc.*, Dec., 1886, p. 857.

Euphorbia Drummondii, Boissier, a native of West Australia, is stated to possess valuable anæsthetic properties, and to contain an alkaloid which Dr. John Reid, of Port Germain, South Australia,

called *drumine* (*Austral. Med. Gaz.*, Oct, 1886). A tincture is prepared of the plant or milk juice with alcohol containing hydrochloric acid, then concentrated by distillation, precipitated by ammonia, and filtered; the residue is dissolved in dilute hydrochloric acid, decolorized by animal charcoal and evaporated when boat-shaped colorless crystals are obtained. The alkaloid is stated to be almost insoluble in ether, but freely soluble in chloroform; also in water. A 4 per cent. solution of the alkaloid dropped into the eye produced local insensibility without appreciably dilating the pupil. A subcutaneous injection of 3 grains showed no effect in a cat beyond local anæsthesia; but a larger dose by the mouth caused paralysis of the limbs and difficult breathing, and strychnine failed to produce muscular contraction. Applied to the tongue or nostrils, loss of taste was observed, but small doses swallowed were not followed by any perceptible constitutional symptoms. Dr. Reid recommends the alkaloid more particularly in small operations, sprains and local irritation.

More recent experiments made by Dr. A. Ogston (*Brit. Med. Jour. Feb. 26th. 1887.*) demonstrate that drumine has little if any effect as an anæsthetic. Instilled into the conjunctiva it produced no anæsthesia and had no perceptible effect on the pupil. Used hypodermically on four persons in doses of 4 and 6 minims of a 4 per cent. solution, a sharp and aching pain, followed by swelling and tenderness of the spot was produced, but no anæsthesia. The material employed has been received directly from Dr. Reid.

Euphorbia helioscopia, Lin.—A case of severe ulceration is reported by Dr. Baudry (*Bull. md. du Nord*), resulting from the application of a poultice of the bruised plant. The milk juice is stated to be employed by peasants as a cure for warts.

This annual, which belongs to the group of *Tithymalus*, is indigenous to Europe and naturalized in some parts of the United States, in fields and waste places, and is characterized by its terminal umbel-like inflorescence, its obovate, finely serrate and more or less wedge-shaped leaves, and its smooth, almost three-lobed fruit containing coarsely reticulated, brownish seeds. With some botanically allied species it was formerly employed as a hydragogue cathartic and is regarded as being less acrid than many other species of the same genus.

Euphorbia Peplis, Lin., is said to be used as a domestic remedy in

hydrophobia, and has been used successfully by Dr. Afonsky (*Russk. Meditz.*, 1886), as a preventive, the drug being given in the form of powder after cauterizing the wound with hydrochloric acid, and using also pilocarpine hypodermically.

This species is likewise an annual, has thickish, obliquely oval entire leaves, axillary flowers and smooth fruits with smooth seeds, and grows in southern Europe. It is used as a cathartic like *Euph. Peplus*, *Lin.*, which is also an annual, but has roundish, entire and somewhat petiolate leaves, a corymbose inflorescence, the capsule-lobes two-keeled on the back, and grayish pitted seeds; the latter species has established itself in some parts of the United States.

Factitious pepper has made its appearance in the Austrian market, and is manufactured in Budapest. N. Wender describes it (*Zeitsch. Oest. Apoth. Ver.*, 1887, p. 147) as resembling a ribbed pill, and states that it is sold at about two-fifths of the wholesale price of Singapore pepper, and that it has been used for adulterating unground pepper to the extent of 75 per cent. Examined by Dr. Hanausek, this artificial product was found to be manufactured of wheat flower, most likely mixed with alcoholic extract of pepper (the oleo-resinous by-products left in preparing piperine? *Editor*), and colored with a black pigment, lampblack; it was free from capsicum.

Olea fragrans, *Thunberg*, and *Forsythia suspensa*, *Vahl*, two Japanese oleaceæ, according to J. F. Eykman, contain a new glucoside, $C_{26}H_{32}O_{11}$, which crystallizes in colorless silky needles, is insoluble in ether and petroleum, and sparingly soluble in cold water, from which solution it is not precipitated by lead and other mineral salts. By oxidation with chromic acid it yields a compound having the odor of vanillin, and by boiling with acids it is decomposed into glucose and a substance of phenolic properties, the latter being readily soluble in alcohol and ether, sparingly soluble in water and insoluble in petroleum benzin.—*Jour. Chem. Soc.*, 1886, p. 1040.

In its physical properties the new glucoside resembles *phillyrin*, $C_{27}H_{34}O_{11}$, the composition and properties of which were investigated by Bertagnini in 1860, but which had been used by Carboncini since 1825 as a febrifuge. The latter had at first regarded it as an alkaloid; in 1836 he published the process by which he obtained it from the bark of the South-European species of *Phillyrea*. This process consists essentially in preparing a decoction, adding lime, exhausting the sediment with alcohol, decolorizing and crystallizing.

Rubus Chamæmorus, *Lin.*, known as *cloudberry*, is indigenous to Canada and the White Mountains, to Northern Asia and Northern Europe. The amber-colored fruit is of a pleasant acidulous taste. The pubescent and wrinkled leaves are about $1\frac{1}{2}$ inch long and 2 inches broad, reniform in shape, roundish five-lobed and crenately dentate, have an unpleasant sweet, afterwards bitter taste, and are popularly used in Siberia in various urinary complaints. Recently (*Russk. Med.*, 1886) the leaves have been recommended by Dr. Ivan Troitzky, of Smolensk, as an excellent diuretic in dropsies, in the form of infusion prepared from a drachm of the bruised leaves by digestion with a cupful of boiling water; this quantity is taken morning and evening for about a month; the taste is stated to be not very unpleasant, and the patient to become habituated to this tea.

Cassia alata, *Lin.*.—The leaves are recommended by Conillebault (Thèse, Paris, 1886) for giving prompt relief in ringworm; they are moistened with water and the affected parts are then rubbed: or, an acetic extract of the leaves may be used.

In India the plant is regarded as a cure for poisonous bites and for venereal eruptions, and the leaves have long been used for curing ringworm. Lindley describes the leaves as being 2 feet long, abruptly pinnate. Leaflets opposite, from 8 to 14 pairs, the exterior largest, linear-oblong, obtuse or emarginate, with a point, smooth, entire, veined; 3 to 6 inches long, 2 to $2\frac{1}{2}$ inches broad; the lower pair somewhat distant, nearly round and reflexed back on the stem or branches. Petioles channelled, the channel large and formed by two thin firm yellow borders. There is a cross-bar between each pair of leaflets, covered with small dark-colored bristles, and there is no other gland. Stipules auriculate, rigid, pointed, persistent, appearing like prickles.

The plant is shrubby like *Cassia Sophora*, *Lin.*, the leaves of which are similarly employed. *Cassia Tora*, *Lin.*, an annual of Southern Asia, is reputed to have similar antiherpetic properties; likewise *Cassia occidentalis*, *Lin.*, which is common throughout the tropics, has been naturalized in the Southern United States as far north as Virginia, and is known in some localities as *styptic weed*.

Physostigma.—In a paper read before the Chemists' Assistants Association, P. Macewan stated (*Phar. Jour. and Trans.*, Feb. 5, 1887, p. 641), that the cylindric seed noticed by Mr. Holmes among commercial calabar bean in 1879, does not appear to have occurred in the

market since that time. The commercial drug varies in color between violet-black and coffee-brown, the former being the fully ripe seeds, and the latter probably immature. For assaying the seed it is best ground in a mill. The two varieties were found to contain 7.2 per cent. of moisture; the black yielded 3.1, and the brown seed 3.4 per cent. of ash. Petroleum ether extracted from the brown 0.2, and from the black 1.068 per cent. of a golden yellow thick oil, containing crystals of physosterin. Ether now extracted 0.36 per cent. of a yellow oil of agreeable odor, and containing a granular substance apparently different from physosterin. For estimating the alkaloid, the volumetric process, with Mayer's solution, failed to give reliable results, but the gravimetric method was more satisfactory. The author recommends the following process: exhaust the powdered bean, by digestion and percolation, with a mixture of alcohol 3 parts and water 1 part, evaporate the spirit, precipitate with lead acetate, remove excess of lead from the filtrate, render alkaline by ammonium carbonate, and dissolve the alkaloid with chloroform. The alkaloidal residue should be of a pale amber color, and wholly soluble in dilute acid. Thus obtained the alkaloid was found to be soluble in ether, and its iodohydrargyrate to be quite soluble in alcohol; for these reasons the author is inclined to doubt the existence, in calabar bean, of calabarine, announced by Harnaek and Witkowski.

Astringent qualities of Heuchera and Mitella.—F. W. Anderson reports (*Botan. Gaz.*, 1887, p. 65,) that the roots of *Heuchera hispida*, *Pursh*, *H. cylindrica*, *Douglas*, and *H. parvifolia*, *Nuttall*, are much used in the west by hunters, prospectors and others as astringents, particularly in cases of troublesome diarrhœa caused by the drinking of water in alkali regions. *H. parvifolia* is the commonest species in Northern Montana. Of milder and somewhat slower action is the root of *Mitella pentandra*, *Hooker*, which contains also a bitter principle, and is not likely to cause sudden constipation like the heucheras.

Vitis vinifera, *Lin.*—A. Hilger and L. Gross have examined (*Landw. Vers. Stat.*, 1886, 170–196,) the organic constituents of different parts of the grape vine. The sap exuding from cut vines contains sugar, inosit, a mucilaginous body, succinic acid, tartrates and citrates. The young shoots and leaves contain potassium bitartrate, calcium tartrate, tartaric and malic acids, quercetin, tannin, starch, gum, glucose, saccharose, inosit, oxalic and glycolic acids, an ether-soluble substance, ammonium salts, and calcium sulphate and phosphate; in au-

tum malic acid and inosit are absent. The tendrils contain besides much pectin compound, sugar, potassium bitartrate and calcium oxalate. The fruit contains tartaric and malic acid, free and combined with potassium and calcium, tannic, succinic, glyoxylic and glycolic acids, inosit, dextrose, levulose, albuminoids, and traces of quercitrin and quercetin.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, APRIL 19, 1887.

On motion of the registrar Mr. W. J. Jenks was called to the chair. The minutes of the last meeting were read and no corrections being required they were approved.

The actuary presented on behalf of James T. Shinn the report of the Sixth International Pharmaceutical Congress, held in Brussels, from 31st August, to 6th of September, 1885; and a specimen of Oil of Camphor from Joseph W. England.

The registrar read a paper upon the preparation of *Fluid Extract of Wild Cherry Bark*, by Cyrus M. Boger, Ph. G., which was on motion referred to the committee on publication.

The registrar also read a paper upon *Emulsionizing Chloroform and Ether* by means of gum arabic, which was also referred to the same committee. One of the members present said he had made, while employed with Prof. Parrish, emulsions in almost the same manner and with very satisfactory results. See page 189, vol. for 1872, AMERICAN JOURNAL OF PHARMACY.

Mr. Procter inquired whether any one present had any experience in making a mixture of *Horsford's Acid Phosphates*, pyrophosphate of iron and strychnine, syrup and water. When made the mixture contained a granular precipitate; the customer stated that as dispensed in New York it was of a light greenish color and clear; this it was thought could only be accomplished by filtration which would deprive the solution of much of its value.

Prof. Maisch presented to the cabinet a specimen of *Chinese rouge*, consisting of paper covered on one side with *carthamin*, this layer being of a green color and strong metallic lustre. The coloring matter answers to all the tests for carthamin. The specimen was given to him by our fellow member, Charles A. Heinitsh, who stated that over 50 years ago it used to be sold in his father's store. Mr. Thompson stated that it was replaced by what was called *pink saucers* which some years later were largely sold for dyeing small fabrics and delicate articles; the coloring matter in these saucers frequently showed the same metallic lustre, and was claimed to be carthamin. The chairman said he remembered the Chinese rouge quite well when he was first an apprentice.

Professor Maisch reminded the meeting that at a former meeting he had exhibited specimens of *Strophanthus*, (see March Number p. 158), the seeds of which possess properties similar to digitalis. These seeds were again shown

and attention was drawn to the awnlike appendage of the apex of the seed, this appendage being naked for nearly two inches, and above this portion, for an inch or more, of a delicate feather-like appearance from the long white hairs attached to it. This species is known to come from the interior of Africa, while *Strophanthus hispidus* from the river Niger, in Western Africa, has seeds with a shorter awn and brownish hairs, and has not been employed medicinally of late years. A copy of a recent number of the "Garten Zeitung" was shown containing an illustration of a new species of *Strophanthus*, discovered near the Kongo River and which is now being cultivated in the botanical garden at Breslau. The seeds are provided with an awn which is feathery from base to apex; they are poisonous, but it has not been determined whether the poisonous principle is identical with the strophanthin contained in the seeds from the eastern section of Africa. The flowers of the Kongo plant are much larger than those of *Str. hispidus*, and the bands into which the corolla lobes are prolonged, are much longer.

Mr. Procter asked whether any of the members had had any experience with the *torsion balance*. (See February Number p. 107.) He had lately been using one on trial which while it would carry eight ounces on each pan was still sensitive to a milligramme and even rough usage did not seem to injure it; the results of his experiments so far were quite satisfying and really surprising.

There being no further business, on motion the meeting adjourned.

T. S. WIEGAND, *Registrar*.

EDITORIAL DEPARTMENT.

New buildings for Colleges of Pharmacy.—We are much pleased to make record of the completion of two new buildings specially erected for the accommodation of Colleges of Pharmacy, one in Boston and one in Baltimore.

Of these two institutions, the Maryland College of Pharmacy has a legal existence of 46 years, having obtained its charter in 1841. The course of lectures instituted in the same year was continued until 1847, and after a repose of ten years, the school was reopened in 1857 and maintained an upward course ever since. In 1876, the College secured its own home by the purchase from the city of a building on Aisquith near Fayette street, which had been used for a grammar school. The erection on this site of a new building was commenced last year, and it is now ready in all its parts for use for the designed purpose. The main building is three stories in height, the staircase being on the north side and beyond this the janitor's dwelling. Each floor of the building covers a space of 45x85 feet. On the first floor is the library and trustees' room, the museum, and a large lecture room 43x63 feet with a seating capacity of 412, and occupied by the Professor of Materia

Medica. The second floor is occupied by the Professor of Pharmacy, and contains a lecture room with 200 seats, the professor's private room, a laboratory for pharmaceutical purposes accomodating about 100 students, and adjoining this room a private laboratory. The third floor, containing the Department of Chemistry, is divided in the same manner, and furnishes facilities for lectures and laboratory work, including the balance room.

The Massachusetts College of Pharmacy was organized in January 1823, but it did not obtain a charter until 1852. Lectures on chemistry were delivered at irregular intervals, mainly for the benefit of the members of the College; but a determined effort for the systematic instruction of young employees was first successfully carried out in 1867, and has been continued ever since, improvements being provided for, as called for by experience and by the general progress of science. Nearly two years ago a lot of ground was secured on the corner of St. Botolph and Garrison streets in close proximity to the intersection of the Providence and Albany railroads. The building erected on this lot will be dedicated to its uses on the 4th of May. The basement story contains, besides the boiler room, janitor's quarters and lavatory, the pharmaceutical laboratory. The first floor is occupied by the library, trustees' room, reading room, and the lecture room for the Professor of Pharmacy. The lecture room on the second floor will be occupied by the Professors of Materia Medica and Chemistry, and a large room has been set apart for instruction in microscopy and urine analysis. The entire third floor has been fitted up for the department of analytical chemistry, with suitable rooms for balances, stock, &c. Rooms for the private use of each professor have been provided on each floor.

With such increased facilities for thorough instruction, secured through the devotion and liberality of their members, both institutions deserve the sincere congratulations of all interested in pharmacy, and their best wishes for continued and increased prosperity.

The Botanic Garden at Liège lost its valuable herbarium in the early part of April; a fire broke out in the museum, and although it was extinguished in about half an hour the collection was destroyed in spite of the efforts of the professors and students to save it. The origin of the fire has not been ascertained.

Ground Pumpkin Seed was the subject matter in an action for damages before the Court of Common Pleas in Philadelphia during the past month. By the testimony it appeared that a piece of paper, merely with the words "emulsion of pumpkin seeds" written on it, was presented by the plaintiff, a lady, at the counter of a drug store. The preparation, she was told, would cost 40 cents, and on her objecting to the price she was informed that she could have the ground seeds, which she could take mixed with sugar and milk. She bought the ground seeds, and was furnished with 8 ounces at 15 cents, and with the instruction to take one-half the quantity mixed with a pint of milk, and in case this had not the desired effect, to take the other half a few days afterwards. She took the whole quantity stirred in a pint

of milk, and after some hours was taken with severe pains, which she endeavored to relieve by taking several doses of castor oil and oil of turpentine; but failing in this a physician was called in, who, after a digital examination, found the bowels impacted, and when this was relieved a considerable quantity of the fragments of the tissues of pumpkin seed was seen among the fecal matter. She was attended by this physician about a week, and some time afterwards another physician was consulted, who found her still suffering from the after effects of the impaction. She subsequently called on the druggist and demanded money (\$10), and on being refused threatened to sue for damages, publish the case in the newspapers and ruin the business of the druggist.

These are, substantially, the facts elicited during the trial. The memorandum on the paper was stated to have been written by a physician, who, on account of sickness, was not present at the trial. The paper had contained neither signature or directions or the name of the patient, and had not been preserved. The aim of the prosecution seemed to be to have this paper regarded as a prescription, and that in not furnishing the article called for the clerk had prescribed for a patient without being a physician. These attempts failed. In regard to the character of the powder, it was contended that it should not have been like saw-dust, but should have been ground to an impalpable powder, and that this could be accomplished by thoroughly drying the seeds. It was, however, admitted that the seeds were entirely harmless, and could be eaten in large quantity without injury; also that the integuments of corn were of a similar nature and indigestible, like the integuments of pumpkin seeds. It was further shown that pumpkin seeds were sold unbroken, ground and in the form of emulsion; that of late years the seeds ground with the integuments were recommended by physicians as being more efficacious than without them, and that by some they were ordered in a much coarser condition than what had been sold to the plaintiff. It was admitted by the latter that she had been troubled with tapeworm for several years, had taken medicines of different kinds, and was now free from the parasite; but she alleged not to be able to tell the precise time when she got permanent relief from it, and that at the time in question she was merely suffering from dyspepsia. No other testimony was offered as to her condition previous to taking the ground seeds.

In the charge to the jury the judge stated that the gist of the action was negligence, and that it was for the jury to determine whether the medicine as prepared was a dangerous article, and whether it produced the injury in question, or whether this resulted from a previous use of purgatives, from the enfeebled physical condition of the plaintiff, or from any cause with which the remedy was not connected. The jury returned a verdict for the defendants.

Polarization of Volatile Oils.—Mr. A. M. Todd informs us that a note containing the results of further experiments with pure oils of erigeron and erechthites—in addition to those mentioned on p. 165 of our April number—will be ready for the June number.

OBITUARY.

August Wilhelm Eichler, who died in Berlin, March 2d last, was born April 22d, 1839, at Neukirchen, Hessia, and finished his studies at the University of Marburg, from 1857 to 1860, under Prof. A. Wigand, recently deceased (AM. JOUR. PHAR., 1887, p. 53). In 1861 Dr. Eichler went to Munich as the assistant of Martius, habilitated at that University as lecturer in 1865, and after the death of Martius, became the editor of the *Flora Brasiliensis*. In 1871 he accepted a call as Professor of Botany and Director of the Botanical Garden to the University of Graz, in 1873 to Kiel, and in 1878 to Berlin, where he reorganized the botanical garden, arranged the botanical museum erected in 1880, and continued his labors as Professor of Botany until prostrated by leucæmia about a year ago. He was the author of an excellent work on the morphology of phaenogams published under the title of "Blütendiagramme" (diagrams of flowers), elaborated a large number of natural orders for the *Flora Brasiliensis*, furnished his students with an acceptable "Syllabus of Lectures on Systematic and Medico-Pharmaceutical Botany," and wrote many essays on botanical subjects for various periodicals and for the transactions of different learned societies. The funeral took place from the botanical museum which the deceased savant had built up.

Information has been received of the death of the following graduates of the Philadelphia College of Pharmacy:

Albert E. Brown, of Morris, Ill., Class 1886, died at Los Angeles, Cal., Feb. 3, 1887.

William J. Killingbeck, of Camden, N. J., Class 1880, died at Las Regas, New Mexico, Jan. 13, 1887, aged 29 years.

Harry H. Kneidler, of Gwynedd Township, Montgomery County, Pa., Class 1882, died at the age of 27 years, in Reading, Pa., where he had established a lucrative business.

THE AMERICAN JOURNAL OF PHARMACY.

JUNE, 1887.

BISMUTH OXYIODIDE.

A contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

BY FRANK N. MOERK, PH.G.

Read at the Pharmaceutical Meeting, May 17.

In the March number of the *AMERICAN JOURNAL OF PHARMACY*, I gave a method for the preparation of pure oxyiodide of bismuth. The salt obtained presents a characteristic crystalline appearance, and if made from a subcarbonate perfectly free from subnitrate, is of a copper-red color. The presence of very small quantities of subnitrate gives a purplish tint to the compound, the depth of which depends upon the amount present.

My attention was called to the crystalline structure, and it was asserted that as the preparation is used as a local application for dusting on sores, it is necessary to have it in as fine a state of division as possible. A specimen was shown me, made by a large firm of this city, which was in the condition of an impalpable powder, bulky, and of a light brick-red color. It was stated to be pure as found by analysis.

To obtain the oxyiodide in this condition I undertook new experiments.

Powdering the crystalline salt resulted in yielding a yellowish-red powder, dense and cakey. This is only gotten after long-continued trituration, and in small quantities.

Next were tried a number of modifications of the process published, such as using the acid of various strengths, adding these to the subcarbonate, &c., but they did not give a superior product, being crystalline in every instance.

As a final attempt, bismuthous hydrate was precipitated, and this treated with hydriodic acid; the product was amorphous and of a red color. After a number of trials the following formula was adopted as giving a satisfactory preparation:

Iodine.....	4.6 gm.
Bismuth subnitrate.....	10 gm.
Nitric acid, 1.42.....	10 cc.
Solution of soda, U. S. P.....	150 cc.
Water, a sufficient quantity.	

The iodine is covered with 50 cc. water, and converted into hydriodic acid by passing H_2S through the mixture, boiling to remove excess of H_2S and filtering.

The subnitrate is dissolved in the nitric acid, diluted with 10 cc. water, and then enough water added to produce a slight permanent opalescence; this mixture is then slowly poured into the solution of soda, taking the precaution to stir constantly. The precipitate is washed by decantation until the washings cease to blue red litmus paper; 50 cc. water added to it, and the hydriodic acid gradually poured in until after stirring and allowing to settle the supernatant liquid has a yellow color. The oxyiodide is washed by decantation, removed to a filter, allowed to drain, and, finally, dried at a temperature not exceeding $100^\circ C$. The oxyiodide so gotten has a light yellowish-red color, and contains no water of crystallization, as was found by analyzing some made without the application of heat.

The process is tedious and laborious; the variability of the commercial subnitrate tends to make it wasteful. Ordinarily the subnitrate yields from 79 to 82 per cent. of oxide, but in the above experiments the salt gave as much as 85 per cent. Bi_2O_3 . It was found that in the manufacture of this ammonium hydrate had been used to increase the yield as the odor of ammonia was perceptible on warming with $NaOH$.

The amount of iodine given above was calculated to convert 10 gm. of this subnitrate into oxyiodide, and any one making large quantities would do well to examine the subnitrate for its percentage of oxide and make a calculation to suit.

Linseed oil has been found by a correspondent of the *Boston Med. and Surg. Jour.* to be a very efficient remedy in pruritus ani with no rectal complications; when freely used externally it gives immediate relief.

AMYL ACETATE.

BY HENRY TRIMBLE.

Read at the Pharmaceutical Meeting, May 17th.

This compound ether has recently come into use for manufacturing purposes without attracting any scientific attention. Its value depends on the excellent solvent power for pyroxylin which it possesses. Good soluble gun cotton will dissolve in it until a jelly is formed and the vessel may be inverted. On this account it has become valuable to the manufacturer of celluloid, and to the manufacturer of certain kinds of lacquer for coating brass and copper. These two industries are consuming enormous quantities of this solvent, and the probabilities are that the use of it has not fairly commenced.

The employment of acetate of amyl or pear oil in the manufacture of artificial fruit essences has long been known, and for this purpose it has commanded a high price, so high indeed as to exclude the possibility of its general use as a solvent; but for the above mentioned industries it can be made commercially pure to answer the purpose as well as the highly purified and more agreeably smelling compound. Two patents have been taken out in England during the past three years bearing on this subject. One on account of its property of dissolving gun cotton, the other on a method of manufacture. In the former the inventors claimed the solution to be valuable for the making of varnishes, and that "when 200 parts nitro-cellulose are mixed with 600 parts acetate of amyl a mass of doughy consistency is obtained, which can be used for any purpose for which celluloid is used. With the addition of castor oil, china clay, and a small proportion of certain essential oils, a compound suitable for the production of artificial leather may be produced."

Several methods of manufacture have been prepared, but the one most common in this country consists in heating in a lead or glass retort a mixture of acetate of sodium or calcium, sulphuric acid and fusel oil.

The ether distils at 137° C., has a specific gravity at 15° of .876 and is almost absolutely insoluble in water. Its solvent action is not confined to gun cotton for it readily dissolves tannin, fixed and volatile oils, resins and camphors, and may become a valuable solvent in pharmacy in addition to the several uses it already possesses.

COLORLESS HYDRASTIS.

BY GUST. STEINMANN, PH. G.

Read at the Pharmaceutical Meeting, May 17.

In the examination of three samples from different manufacturers of colorless hydrastis, I find in No. 1 the alkaloid as sulphate in a mixture of glycerin and water having the specific gravity, 1.15, and giving after ignition 0.05 per cent. ash. In No. 2 two acids were present, hydrochloric and sulphuric, combined with the alkaloid, aluminium, and a trace of potassium; specific gravity 1.13; ash 0.35 per cent., which gave 0.12 per cent. aluminium oxide, showing that the alkaloid is present as chloride and aluminium as sulphate. The potash alum probably, was used in the process of decolorizing or to prevent the method of manufacture becoming known. In No. 3 the alkaloid was present as a chloride; also found boracic acid; specific gravity 1.12. There being organic matter present it was difficult to reduce to ash.

The tests given by the manufacturers are the ammonia test:

No. 1. Slight precipitate.

No. 2 and 3. Curdy precipitate.

Fluorescence tests:

No. 1 and 3. With sulphuric acid and potassium permanganate.

No. 2. Equal parts of alcohol and colorless hydrastis with a few drops of ammonia.

The ammonia test in No. 1 gave a clear solution with a slight precipitate; 2 and 3 cloudy solutions and heavy precipitate. With Mayer's reagent all gave cloudy solutions with slight precipitates which, on heating, became clear, leaving a light yellow precipitate, the liquids becoming turbid on cooling. The fluorescence test, which is characteristic for the alkaloid, is made by adding sulphuric acid to the solution, then potassium permanganate, the color of which, on shaking, disappeared, leaving a decided blue fluorescence. When the original solutions were evaporated in a water bath to a syrupy consistency they assumed a yellow color.

Samples were prepared: one containing 20 grains of hydrastine-sulphate in a solution of glycerin and water having the specific gravity 1.15, which answered the tests of No. 1, and, no doubt, is identical. Another was prepared containing 20 grains of the chloride of hydrastine with alum, which gave characteristic tests as in No. 2, with the

exception of the ammonia test, which gave a precipitate of less bulk. The third was prepared from the chloride with boracic acid, which gave characteristic tests, but the ash was not as difficult to obtain. These experiments were made in the chemical laboratory of the College.

AN ANALYSIS OF CACAO SHELLS.

A contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

By P. S. CLARKSON.

Read at the Pharmaceutical Meeting, May 17.

As no complete analysis of these shells or husks, as they are sometimes called, is to be found in any work on chemistry and as it is stated that they are used to adulterate ground spices and various other foods, it was thought desirable to make one, to aid, if possible, their detection when so used. These shells can be purchased at any of the large groceries, being put up in packages of one pound each by a well known chocolate firm and recommended for making a drink resembling coffee. To make this beverage the shells are boiled with water, strained, and to the resulting infusion, milk and sugar are added.

The amount of ash was found to be 9.07 per cent. which in addition to the usual constituents contained aluminium. This element has not been reported in some analyses of the ash, but was found by Wanklyn in the ash of cacao.

There was found 5.32 per cent. of fat soluble in petroleum spirit and ether melting at 35°. This is the oleum theobromæ of the Pharmacopœia.

A resin was found to the extent of .93 per cent. which was soluble in ether and alcohol. It had a strong odor of cacao.

An alkaloid consisting of .90 per cent. was obtained with absolute alcohol. This gave the usual reactions for theobromine. A large quantity of coloring matter, (cacao red), was also extracted by this menstruum. The amount of alcoholic extract was 5.60 per cent.

The mucilage extracted by water was 5.60 per cent. The remainder of the 6.30 per cent. extracted by water was coloring matter with albuminoids.

The albuminoids soluble in dilute soda solution amounted to 7.90 per cent. A determination of the whole of the albuminoids present was made by a combustion with soda-lime which showed 10.92 per cent.

The matter extracted by dilute acid was 6.00 per cent. consisting of albuminoids, calcium oxalate, etc.

The amount of lignin and incrusting substances dissolved by chlorine water was found to be 12.60 per cent. ; the intercellular substances, (hydrocellulose, etc.,) amounted to 14.10 per cent. and the cellulose was 20.92 per cent.

SUMMARY.

Ash.....	9.07
Moisture.....	66.0
Petroleum extract, cacao butter.....	5.32
Ether extract, resin.....	.93
Alcohol (absolute) extract: alkaloid .90, coloring matter 4.70.....	5.60
Distilled water extract: mucilage 5.60, albuminoids .70.....	6.30
Dilute soda extract, albuminoids.....	7.90
Total albuminoids by combustion.....	10.92
Dilute acid extract, calcium oxalate, etc.....	6.00
Loss by chlorine, lignin, etc.....	12.60
Hydrocellulose, etc.....	14.10
Cellulose	20.92
	<hr/>
	95.34
Undetermined matter and loss.....	4.66
	<hr/>
	100.00

LABORATORY NOTES.

By HENRY TRIMBLE.

Read at the Pharmaceutical Meeting, May 17th.

In addition to the work on cacao shells by Mr. Clarkson there have been examined three other drugs, in the form of powder, by students in the Chemical Laboratory during the past winter; the object being to do something towards establishing standards which might aid in determining the impurity of a sample without taking the time to examine the character of the adulteration, the results to be a guide and an addition to a physical examination, and not considered as absolutely conclusive.

Jas. A. Ferguson Ph. G., determined the amount of ash in three samples of *Ceylon cinnamon* with the following results: No. 1, 4.00 per cent.; No. 2, 4.00 per cent.; No. 3, 5.00 per cent. 10 grams of No. 1 were exhausted with petroleum spirit in a continuous extraction apparatus, and yielded .75 per cent. of a yellowish oleoresin, which became crystalline and was almost completely soluble in 95 per cent. alcohol. That insoluble in petroleum spirit was exhausted in the

same manner with stronger ether, by which 1·20 per cent. of a reddish-brown extract were obtained. This had in a marked degree the odor and taste of the original drug, thus showing that petroleum spirit will not exhaust all the odorous principle from this bark. Absolute alcohol extracted 14·70 per cent. of a reddish-brown mixture composed of resin, tannin and coloring matter.

The same gentleman estimated the ash in four samples of powdered *cinnamon cassia* and obtained in No. 1, 2·8 per cent. ; No. 2, 2·5 per cent. ; No. 3, 4·6 per cent. ; No. 4, 5·00 per cent.

In both of the above series No. 1 was undoubtedly pure and may be taken as a standard. In the first series No. 2 was also probably pure, while No. 3 was, no doubt, adulterated. The cassia sample No. 2 was probably pure, while Nos. 3 and 4 were undoubtedly adulterated ; such samples would be worthy of further critical examination. From the amount of ash in cacao shells it would be reasonable to suppose that they had become mixed with the cassia and raised the ash over 2 per cent.

R. C. Werner, Ph. G., examined five samples of *ground mustard* (*Sinapis alba*). No. 1, the purity of which I can vouch for, yielded 6·00 per cent. of ash, and was free from starch. No. 2, 5·00 per cent. ; No. 3, 4·50 per cent. ; No. 4, 4·25 per cent. ; No. 5, 5·25 per cent. of ash.

Each of the last four gave abundant evidence of starch. As that was the only adulteration found, the ash might reasonably be taken as an index of the amount of it. In which case we would have about the following :

No. 1.	Pure.			
No. 2.	Mustard	83 parts.	Starch	17 parts.
No. 3.	Mustard	75 parts.	Starch	25 parts.
No. 4.	Mustard	70 parts.	Starch	30 parts.
No. 5.	Mustard	87·5 parts.	Starch	12·5 parts.

Nos. 2 and 3 were obtained from grocers ; Nos. 4 and 5 from pharmacists.

G. Steinmann, Ph. G., examined seven samples of *powdered squill*. The ash amounted from No. 1, to 3·30 per cent. ; No. 2, to 8·20 per cent. ; No. 3, to 2·70 per cent. ; No. 4, to 3·95 per cent. ; No. 5, to 3·65 per cent. ; No. 6, to 3·30 per cent. ; No. 7, to 4·00 per cent. No. 1 was known to be pure, therefore was free from starch or any other substance that might be added on the pretext of assisting the grinding or

preventing "caking" of the powder. Although this specimen has been kept since January there is no sign of the "caking" sometimes complained of; the only precaution has been to keep it in a well corked bottle. The ash of No. 2 consisted largely of calcium sulphate, which points to an admixture of about 5 per cent. of gypsum, added, no doubt, to prevent the "caking" as well as to cheapen. No. 3 contained starch, and Nos. 4, 5 and 6 were probably pure, a difference in amount of moisture would account for the variation in ash. No. 7 contained starch, and probably some other impurity or the ash would have been less from the presence of starch, instead of higher than the average.

ON BECHI'S TEST FOR COTTON-SEED OIL IN OLIVE OIL.

Abridged from the Report of the Commission of Florence appointed to examine "Bechi's Test." See *L'Orosi*, Feb. 1887, p. 37.

TRANSLATED BY JOSEPH W. ENGLAND, PH. G.

Read at the Pharmaceutical Meeting, May 17th.

In a lengthy and exhaustive communication, the Commission of Florence has made public the results of the experiments upon the value of the "Bechi's Test" as a reliable and positive indicator of the presence of cotton-seed oil, fraudulently contained in olive oil. This Commission, appointed in the early part of last year, was as follows: U. Peruzzi, N. Ridolfi and Prof. G. Roster.

The method of Professor Bechi, as used by the Commission and with successive modifications by the author, consists in the subjection of a sample of the suspected oil to the heat of boiling water, after first having added an alcoholic solution of silver nitrate, and amylic alcohol and oil of rape, in the manner and proportions hereinafter indicated.

Take one grain of crystallized silver nitrate, and dissolve in the smallest possible quantity of water (about 1 cc.) and add 200 cc. of alcohol (96°). The addition, also, of 20 cc. of sulphuric ether is a good one, in that it makes the reagent better miscible with the oil to be examined, but it is not necessary. On the other hand prepare a solution composed of 85 parts of amylic alcohol and 15 parts of oil of rape seed. These reagents should be made as needed and not kept on hand for any length of time.

Now, to apply the test, Prof. Bechi takes 10 cc. of the oil to be examined, adds 1 cc. of the alcoholic solution of silver nitrate and then from 8 to 10 cc. of the mixture of amylic alcohol and oil of rape; agitating strongly and then heating on a water-bath for 5 or 10 minutes.

In the case of pure oils, the color remains the same, as it was after the addition of the reagents. In the event that sophistication has been practiced with cotton-seed oil, there will be produced a brownish color, or turbidity, of a varying grade, from a very light brown to a deep maroon or black, according to the quantity of cotton oil present.

With these data furnished by Prof. Bechi, and after having assisted in experiments made by him in support of his method, the Commission instituted a series of long and diligent personal experiments, numbering over 200, in the chemical, biological and hygienic laboratory of the Royal Institute; adhering strictly to the rules as laid down, measuring exactly, in each instance, the quantities of oils and reagents, and using tubes of equal diameters or, in one word, employing the same conditions in all experiments, in order to render the result truly comparative.

The oils used were furnished in part by Prof. Bechi and in part by this Commission; looking, especially, for those olive oils of whose genuine nature there could be no possible doubt and then, secondly, taking good olive oil containing cotton oil. Several of the olive oils were from other countries (Spain, France, Tunis, Dalmatia and Malta, etc.), but the greater number were from various parts of Italy. Some were recent and some old, others pure of 1a, 2a, 3a, quality and others were rancid.

In order to ascertain if the reaction outlined by Bechi was peculiar to cotton-seed oil addition, alone, the Commission found it necessary to extend their experiments upon other oils, vegetable and animal, alone and admixed with pure olive oil.

Every experiment made was in doubles or triples, that is two samples of the oil (marked No. 1 and No. 3) and another sample of the oil (marked No. 2), which had added to it cotton-seed oil in a certain proportion; subjecting No. 1 and No. 2 samples to the heat of boiling water, after the addition of the reagents and leaving No. 3 sample without exposure to heat, in order to compare the colors of Nos. 1 and 2 with that of No. 3. The experiments were then especially directed toward the mixture of olive oil with oil of cotton-seed. The

proportion used for the mixture was, generally, 20 per cent. of the latter oil. The Commission held, that, if the method of Prof. Bechi will determine any such falsification, it is more than sufficient for any exigency, inasmuch as the fraud practiced is always in much larger proportion. The experiments were grouped under five series.

Series A.—Cotton seed oils of various origins.

Eleven samples of oils from the following markets were used:—1. London; 2, New Orleans; 3, Augusta; 4, Louisville; 5, Sample (8 years old); 6, English (Hirsch); 7, Thorn; 8, Maginnis; 9, Planter's; 10, Aldigè; 11, Creole. All these oils treated with the "Bechi test" gave a most intensely brownish color, that exhibited no appreciable variation in shade, according to the origin of the product. The experiments were then repeated upon the oils, using 2 cc. of oil of cotton to 8 cc. of olive oil. The olive oil used was from Pons of Scandicci, upon whose genuineness there can be no question.

Series B.—Pure olive oil, alone, and admixed with oil of cotton.

The series of experiments here outlined were based upon the first, second, and, in some instances, the third quality of 48 oils, giving also the origin of each oil. The samples were subjected to comparative tests, alone, and then admixed with 20 per cent. of Hirsch's English cotton seed oil, the most abundant in Italian markets; in every instance the 48 olive oils, alone, were negatively affected by the reagents, but the instant cotton oil was admixed, and the test then applied, the result was promptly given by the formation of the deep brownish colors in every instance.

Series C.—Various oils, alone, or mixed with Hirsch's English cotton seed oil.

The oils here examined are 25 fixed oils of different qualities, liable to be used as an adulterant. They are, for example, oils of rape (Germany, Milan, Marseilles, etc.), sesame (Levant, Georgia, Bombay, Paris and Grasse), peanuts, poppy, linseed, cocoanut, castor, almond, peach-seed, and cod-liver, and the results show that, in every case, there was no appreciable change with the reagents, but if prior to the application to the test 20 per cent. cotton oil was added, the characteristic color of the reduction was formed.

Series D.—Pure olive oil with other fixed oils, alone, and with cotton oil.

These experiments were made to ascertain if the presence of other fixed oils than cotton seed, in a mixture, would have any modifying

influence upon the reaction, so characteristic with oil of cotton. It is sufficient to say, that the results show that they have none, and the Commission find that the test is therefore limited to that fixed oil alone. The cotton seed oil was added in 20 per cent. proportion, when used with both oils of olive and benne (in the secondary tests), which latter two were evenly divided (i. e. 40 per cent.), while the oil of sesame was added in equal parts to olive oil, prior to the application of the primary tests.

Series E.—Rape oil of different origins, alone, and mixed with cotton oil.

The Commission, in view of the importance that oil of rape obtains in the application of Bechi's test, examined seven oils of various qualities, derived from different provinces. From these experiments, the assertion is made, that while several of the finest samples in the pure, undiluted state, furnished a noticeable change in the formation of a reddish-brown color, this was always made very much darker if 20 per cent. of cotton seed oil was previously added; and, on the other hand, if the rape oil examined was previously diluted with pure olive oil or amylic alcohol, as, for example, in the proportions used by Prof. Bechi in his test, *no* change whatever was evinced.

Finally the Commission wishing to see if a variation of the proportion of the reagents would more clearly demonstrate results, used a stronger solution of silver nitrate, and found that the brownish color could be made to vary from brown to black, according to the quantity of the silver salt added. After numerous experiments, they decided that the original proportions were the best ones to adopt, in that the test would be much more delicate, and would not, under any circumstances, be caused by the rape oil.

To examine olive oil for admixed cotton oil, with Bechi's method, the Commission recommend the division of the suspected sample into three parts, as follows:

No. 1. Tube of the suspected oil and reagents.

No. 2. Tube of the suspected oil and 20 per cent. of cotton oil, and the reagents.

No. 3. Tube of the suspected oil and reagents.

Now expose tubes No. 1. and No. 2. to the heat of boiling water for 5 or 10 minutes, but do not heat tube No. 3; use it simply as a guide to see if No. 1. remains unaffected by heat or becomes colored. If the sample is pure, the oil will remain unchanged, that is the same in

appearance as No. 3., while No. 2. acquires the characteristic color. If the oil in tube No. 1. has been sophisticated with cotton oil the brownish coloration will soon appear, while tube No. 2. will be a much deeper brown; evidently showing that the brownish color is due, in part, to the quantity of cotton seed oil present, as well as the proportion of silver nitrate, and oil of rape.

From all that has been presented and more especially from the clear, concording and uniform results, obtained in the experiments herein detailed, it is evident that the method proposed by Professor Beechi, used with care, and in the manner indicated, has not failed the Commission in a single instance and they feel that they cannot do less, than to most strongly urge its general adoption, as a reliable and positive indicator for the existence of cotton seed oil in olive oil, fraudulently added.

As a matter of interest, the translator has made some experiments and prepared, for your inspection, a number of samples, showing the results with the "Beechi Test," upon a collection of fixed oils in general and some pure olive oils in particular.

No. 1. Pure olive oil expressed from the imported fruit, by Mr. Rich. M. Shoemaker, kindly furnished by Professor Maisch.

No. 2. Is No. 1. tested; darker, somewhat reddish, but transparent.

No. 3. Is No. 1. with one half cotton seed oil, tested; deep brownish-black turbidity and partial precipitate.

No. 4. Olive oil, imported in Florence flasks, obtained from Prof. Maisch.

No. 5. Is No. 4. tested; it bears a close resemblance to No. 2.

No. 6. An equal mixture of No. 4. and cotton seed oil, tested; resembles No. 3.

No. 7. Mestrezat olive oil.

No. 8. The same, tested; slightly reddish, transparent.

No. 9. Is No. 7. with cotton seed oil, tested; turbid, deep brownish-black, partially precipitated.

No. 10. Pure rape oil, tested; it is not unlike, in appearance, that of No. 8.

No. 11. Cotton seed oil, made by the Union Salad Company.

No. 12. The same, tested; deep black turbidity and precipitate.

No. 13. Oil of sesame.

No. 14. The same, tested; slight reddish tinge, but perfectly transparent.

No. 15. Expressed oil of black mustard seed, 23 years old.

No. 16. The same, tested ; no change.

No. 17. Oil of linseed, tested ; remains unaltered.

No. 18. Castor oil, tested ; has acquired a slight reddish tinge.

No. 19. Cod liver oil, tested ; shows a strong reddish tinge, but no turbidity.

In the original article no theory is advanced concerning the chemical reaction that takes place in the application of the "Beechi test," but it seems highly probable that the change is due to a reduction of the silver nitrate to the state of oxide, through the presence of the peculiar yellow coloring principle present in cotton seed oil. The product, after the testing is finished, measures 11.5 cc. showing that the residue is simply a mixture of the suspected oil (10 cc.) and oil of rape (15 cc.), while the alcohols have been totally dissipated, by the heat of the water-bath. The utility of the rape seed oil, in the decomposition, is not explained and whether the amylic alcohol, through any chemical change, exerts any influence is also an unsolved problem.

NOTES ON A FEW DRUGS.

By G. M. BERINGER, PH. G.

Read at the Pharmaceutical Meeting, May 17.

Having occasion to examine some *oil of erigeron* recently, the specific gravity was carefully ascertained, at the temperature of 60° F., with the 1000 grain bottle ; it proved to be 0.8454. The gravity given by the U. S. Pharmacopœia is 0.850 ; Professor Procter's experiments in 1854, place it at 0.845. The figures correspond very closely and within a limit that may be accounted for by the age of the oil.

Oil of Peppermint. Three samples of American oil recently examined, showed varying densities ; Hotchkiss' oil sp. gr. .9074, rich in menthol ; one of A. M. Todd, sp. gr. .9074, not quite so rich in menthol ; and a sample of another Western distiller sp. gr., .9112, contained but a small quantity of menthol, being undoubtedly a skimmed oil. These figures correspond closely with the statement of Mr. Todd in his article on the subject of "Oil of Peppermint," read at the last meeting of the American Pharmaceutical Association. Mr. Todd states that pure oil of peppermint is never below 0.908 sp. gr., nor when fresh and soluble above 0.917, so that the difference formerly allowable, that is from 0.840 to 0.950, is made ten times as small.

Oil of Bay. The sp. gr. of this oil is stated in the U. S. Pharmacopœia, as about 1.040. A sample obtained from an American distiller, who guaranteed the purity, showed a sp. gr. of 0.9750; another sample from a St. Thomas distiller, showed 0.9945; both of these oils were of fine odor and appearance, and would indicate that the Pharmacopœia had stated the sp. gr. a trifle high.

Popp's stomach powders. At the suggestion of a customer for whom I had purchased the article, I made an examination of the same and found each paper contained about thirty grains of very coarsely powdered sulphide of iron; two dozen of these powders being put up in a box for which \$1.25 was asked. This was to me a novel use of sulphide of iron.

Ground Flaxseed. The U. S. Pharmacopœia requires that ground flaxseed shall yield not less than 25 per cent. of fixed oil when extracted with disulphide of carbon. A sample recently ground to order, yielded thirty per cent. when thus treated, and another lot offered in the market, gave thirty-one. This would show that the requirement is not as full as it should be.

Job's tears. *Coix Lachryma, Lin.*; nat. order Graminacæ. These fruits are being again called for occasionally by fond mothers for the purpose of making into necklaces under the impression that children wearing such ornaments will cut their teeth more easily. The peculiarity of this grass is the formation of the pistillate spikelet being one to two flowered, inclosed within a bract which becomes a round bony shining involucre.

THE FLUORESCENT PRINCIPLE OF WILD CHERRY BARK.

By R. ROTHER.

A decided bluish fluorescence occasionally appears in syrup of wild cherry bark; but by the use of a menstruum, rendered alkaline with ammonia its appearance is invariable. The writer has for some time past been in the habit of employing an ammoniacal menstruum in the preparation of syrup of wild cherry and has never failed to notice the peculiar aspect of the product.

In order to ascertain something further about the nature of this result a considerable quantity of wild cherry bark in coarse powder was percolated with an aqueous menstruum, one-eighth of which being alcohol, and one-sixteenth of it being 18 per cent. ammonia water. On

continuing the percolation for some time it was observed that each new portion of menstruum poured on the top of the column in the percolator was instantly pervaded by the fluorescent tint without apparent diminution of intensity. This indication pointed to the fact that an almost vanishing quantity of the fluorescing body could provoke its characteristic phenomenon and also that its total amount contained in the bark was perhaps incomparably small, but difficult of extraction.

On treating the first half of the percolate with diplumbic acetate a voluminous light-brown precipitate resulted leaving with a sufficiency of the reagent a colorless solution, in which, however, the fluorescence appeared undiminished. The second half of the percolate was much darker brown than the first half, and also possessed a very decided predominance of free ammonia. On treatment with diplumbic acetate until the solution became colorless, a dark green precipitate resulted. The filtrate off this showed an unchanged fluorescence. It was distinctly ammoniacal, but absolutely free from lead. Treated with mercuric chloride in excess, a dingy yellow precipitate resulted whilst the solution ceased to fluoresce. The filtrate gave with ammonia a white precipitate of mercurammonium chloride and a non-fluorescent liquor. This result showed that the fluorescing body was now all contained in the yellow mercuric chloride precipitate. This precipitate, after washing, readily dissolved in ammonia to a colorless solution only faintly fluorescent. On spontaneous evaporation abundant crystals were obtained. These remained unaffected by either chloroform or ether but readily dissolved in alcohol, which, after dissipation, left them in their original form. Viewed under the microscope with a half-inch power, these crystals were seen to be well defined aggregates of slender columns intercrossing at right angles. In such portions of the field where the accumulation was sparser the square arrangement had degenerated into curves, owing probably, to inequalities in the surface of the slide. The crystals were void of polarisance. The writer here uses the term polarisance, as indicating the property of differentiating polarized light. Of course, the meaning of the term stands in no relation to fluorescence. The color effect in polarized light is due to double refraction and subsequent interference which is greatly aided by thin plates of selenite and mica. But fluorescence is an absorption phenomenon.

Another portion of the fluorescent filtrate from the lead precipitate

was evaporated to a syrupy residue having a light red tint. This residue was in large part acidic ammonium acetate. It dissolved readily and completely in alcohol. But chloroform and ether dissolved it only partially. Their solutions gave, on spontaneous evaporation, pasty amorphous residues which after about 8 hours become wholly and very distinctly crystalline. On diluting the original acetic residue with water, boiling it for some time with excess of dilute sulphuric acid, and again concentrating it, a brown red pasty sediment formed. This readily dissolved in ammonia, and after supersaturating the alkali with chlorhydric acid and removing all the ammonium sulphate and most of the chloride with alcohol, a brown-red residue was again obtained from the alcoholic solution after concentration. Treatment of this with ether yielded a faintly red solution which, on spontaneous evaporation, gave a viscid residuum, becoming wholly and decidedly crystalline after about 8 hours. These crystals promptly dissolved in chloroform, ether and alcohol, and were also soluble in water. The alcoholic and aqueous solutions became strongly fluorescent on the addition of ammonia. The red pasty remainder left undissolved by the ether was easily and perfectly soluble in ammonia without fluorescence.

The crystals obtained by means of ether in this instance were identical in properties and appearance with those secured by the same agency from the acetic residue in the first instance. They formed, in slender branched filaments, upwards to one inch in length. Viewed in oblique incident light, they displayed decided rainbow tints, which may result from prismatic dispersion, but, were probably, the iridescence of diffraction. Under the microscope with a one-inch power, these crystals showed no prismatic form although their appearance was very fine. A merely incipient polarescence was observable, which, however, develops with the age of the crystals into an excellent appearance.

The proportional quantity of this crystalline constituent of wild cherry bark is exceedingly small. Without the fluorescing property, as a guide, it would have been practically impossible to detect and isolate it. Judging from its crystalline form it does not appear to be mandelic acid, a decomposition product of amygdalin. It may, however, be an analogue, or a substituted derivative of it. This conjecture leads to the legitimate question, whether or not, it is amygdalin as such, from which the benzoic aldehyde and cyanhydric acid of syrup of wild cherry results.

AN ANALYSIS OF THE LEAVES OF GAULTHERIA PROCUMBENS.

BY FRANK W. DROELLE, PH. G.

(Abstracted from the Author's Inaugural Essay.)

A proximate analysis was made of the finely ground leaves, after they had been separated from the stems, with the following results :

Volatile oil	50 per cent.
Resin and wax.....	2.50 "
Resin soluble in ether.....	2.15 "
Chlorophyll, with small amounts of arbutin, urson and tannin	2.75 "
Tannin.....	5.45 "
Chlorophyll, arbutin and ericolin.....	3.80 "
Mucilage	2.90 "
Glucose and dextrin	3.56 "
Organic acids	3.25 "
Albumenoids.....	4.54 "
Pararabin and allied substances.....	2.20 "
Loss by treatment with chlorine.....	6.35 "
Moisture.....	8.60 "
Ash	4.20 "
Lignin and cellulose.....	45.53 "
Total.....	98.18 "

The moisture and ash were determined in the usual way, and a qualitative analysis of the latter showed the ordinary ash constituents. Fifty grams were taken for treatment with solvents. Petroleum spirit extracted 3.00 per cent. of a soft solid substance, which, in addition to volatile oil, was composed largely of resin with a small quantity of wax.

Stronger ether extracted 4.25 per cent. of a glossy black soft solid of an agreeable odor, composed of chlorophyll with a resin, probably identical with the resin dissolved by petroleum spirit on account of the volatile oil present. Arbutin was found in small quantity in this extract, being readily detected by phosphomolybdic acid. By treating the ethereal extract with water, dissolving the insoluble residue in hot absolute alcohol and evaporating, there was left a resinous mass which on washing with a little ether and recrystallizing from alcohol left a yellowish resinous mass containing crystals which sublimed on heating and gave a yellow color with nitric acid, indicating the presence of urson. Tannin was also found in the ethereal extract, but gallic acid was sought for with negative results.

The absolute alcohol extract amounted to 9.90 per cent., and contained 5.45 per cent. of tannin, which was estimated by both acetate of lead and acetate of copper. A separate determination by means of gelatin and alum gave somewhat higher results.

There were also found arbutin and ericolin, confirming the work of Oxley (1872.)

A small amount of arbutin was prepared by taking 1000 grams of the drug, extracting with hot water, treating the solution with lead hydrate to remove tannin, and with H_2S to remove lead. The filtrate was evaporated to a soft extract, treated with alcohol, and the alcoholic solution set aside. Crystals of arbutin slowly formed, but the amount was considerably smaller than was expected.

Both the ethereal and alcoholic extracts were tested for alkaloids with negative results. Starch and calcium oxalate were also shown to be absent.

SYRUP OF TOLU.

EDITOR AMERICAN JOURNAL OF PHARMACY:—I have read with interest the article by F. Stevenson on Syrup of Tolu, in the May issue of the JOURNAL, and would like to add my little experience in the manufacture of this syrup. I think the pharmacopœial process can be improved upon. The process which I have used for some time—and for which I am indebted to Prof. Remington—is this: For making twenty-five ounces of syrup, take one ounce of Balsam of Tolu, one pound of granulated sugar, and water which has been previously filtered through animal charcoal, enough to make twenty-five ounces (these are essentially the quantities directed by the U. S. P.); rub the Tolu to a fine powder, aided by some of the sugar, and mix this with the remainder of the granulated sugar; now prepare a percolator by placing a piece of cotton in the neck, pack the powder in it, pour in the filtered water and receive twenty-five ounces of percolate. As seen, this is simply a process of cold percolation, but if carried out as described, will furnish a beautiful, clear and highly flavored syrup, which is so desirable. This formula, I am sure, cannot fail to give satisfaction.

Yours,

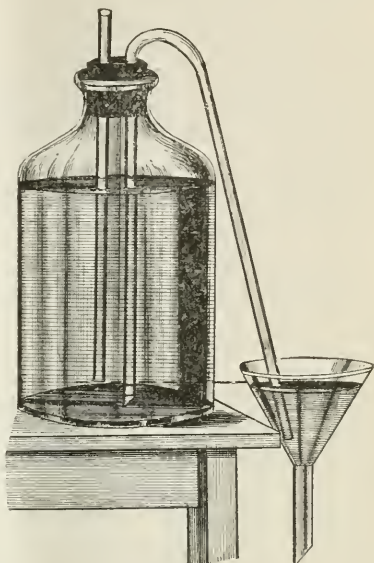
W. H. HOSTELLEY.

Philadelphia, May 7th, 1887.

PRACTICAL NOTES FROM VARIOUS SOURCES.

BY THE EDITOR.

Automatic filtration.—A simple contrivance for this purpose is described by Prof. Dr. O. Billeter, in *Chemiker Zeitung*, 1887, p. 509. The liquid is put into a bottle which is closed by a twice perforated cork. Into one opening a syphon is inserted, the outer arm of which is not much longer than the inner one, and ends in the funnel. A straight tube open at both ends is inserted through the second opening, and its lower end is placed on a level with the height of the liquid to be reached in the funnel. The syphon is filled by carefully blowing through the straight tube, after which filtration proceeds without further attention. Obviously the liquid may be heated or the funnel connected with a vacuum pump.



The apparatus, variously modified, is an old one, but does not appear to be used as frequently as it deserves to be.

A new acid in urine has been observed by Dr. Kirk (*Brit. Med. Jour.*). It was prepared by washing the concentrated urine with ether to remove resin-like compound, then adding to the urine dilute hydrochloric acid, again shaking with ether and evaporating. The prismatic crystals had a strong aromatic odor, and a brown color, but shining colorless needles could be seen scattered here and there. Dr. Kirk proposes to call it *urrrhodinic acid*. In its behavior to solvents and in some of its reactions (Fehling's solution, ferric chloride, etc.) it resembles Dr. Marshall's *glycosuric acid* (see *AMER. JOUR. PHAR.*, March, 1887, p. 131-136), and seems to be identical with the latter, but in a still impure condition. It appears to be a decomposition product of a nitrogenated body, which the author is engaged to prepare in a pure state.

Tyrotaxon, the poisonous compound isolated from certain cheeses, milks and creams by Prof. V. C. Vaughan (see *AMER. JOUR. PHAR.*, 1886, p. 342 and 452) has been further studied by him and F. G.

Novie (*Med. News*, April 2, 1887, p. 369). The explosiveness of the platinic chloride compound lead to its comparison with similar azo-compounds and it seems likely that the poison is diazobenzol butyrate or lactate. From unwholesome oysters a body was obtained which likewise agreed with the tests for diazobenzol. The investigations are continued by the authors.

Acid morphine meconate.—The experiments of D. B. Dott (*Phar. Jour. and Trans.* Feb. 26, 1887, p. 690) render the existence of such a compound very doubtful. Morphine and meconic acid, in various proportions, dissolved in anhydrous alcohol and evaporated, leave an amorphous hygroscopic residue, which is extremely soluble in water and quickly combines with its water of hydration, when the neutral meconate with $5\text{H}_2\text{O}$ crystallizes out, even in the presence of sufficient acid to form the bimeconate.

Toxic dose of atropine.—One-twentieth of a grain of atropine taken in a few divided doses during a day is regarded as a perfectly safe dose. Dr. C. Baum reports in *Phila. Med. Times* the case of a lady, who for acute coryza, had been ordered two granules of atropine sulphate grain each, which were taken in two hours. Toxic symptoms appeared after the first dose, which were greatly aggravated after the second dose, but yielded to appropriate treatment.

Eau de Rabel, Fr. Cod., is a mixture of oil of vitriol 1 p., with alcohol 3 parts, colored by the addition of 1 per cent. of red poppy leaves. T. Gautrand (*Thèse*, Montpellier, 1887) has studied the etherification of this mixture under various conditions, by determining volumetrically the total amount of free acid as H_2SO_4 , and gravimetrically the total sulphuric acid, after decomposing the sulphovinic acid by evaporation and ignition with pure potassium nitrate; the difference between the two determinations indicate the H_2SO_4 ($\frac{1}{2}$) present as sulphovinic acid. He found that the limit of etherification in this preparation corresponded in neutralizing effect to 7.2 per cent. H_2SO_4 , or to the formation of 18.5 per cent. of sulphovinic acid. The main factor affecting the rapidity of the change is the temperature, the limit being reached in summer in about two months, in winter in more than four months, and at 83°C ., the boiling point of the mixture, in less than half an hour. Direct sunlight and the coloring matter do not influence the limit nor the rapidity of the change. In the course of several years a retrograde change takes place, the sulphovinic acid being partly decomposed.

Mixtures of equal weights of sulphuric acid attain in six days the limit of change, corresponding to 12.1 per cent. H_2SO_4 in neutralizing power. A mixture of 1 part of sulphuric acid and 5 parts of alcohol forms in about ten months, sulphovinic acid corresponding in neutralizing power to 5 per cent. H_2SO_4 .

Liquor Ferri chloridi.—The commercial article was found by Geo. Buchner (*Chemiker Ztg.*, 1887, p. 417) to be often contaminated with arsenic, probably as arsenic acid or ferric arsenate. The pharmacopœias do not give a test for this impurity, which is readily detected by treating a small quantity of the liquor with zinc and hydrochloric acid, when the hydrogen gas will produce a yellow, brown or black color upon paper moistened with silver nitrate. Ferric compounds, prepared from such a liquor, will likewise contain arsenic.

In testing for arsenic by Marsh's process the author directs attention to the necessity of heating the reduction tube sufficiently, since by the use of a Bunsen burner an arsenical mirror will be readily obtained, while with the same materials the mirror may not make its appearance on prolonged heating with a Berzelius' spirit lamp.

Ichthyol.—A tarry product is obtained by the dry distillation of a bituminous mineral containing fossil fish; on treating this with sulphuric acid and subsequently neutralizing with sodium carbonate, *ichthyosulphate of sodium* is obtained, known also as ichthyol; it is tar-like in appearance, has a bituminous odor, on heating becomes charred and acquires the odor of liver of sulphur. Its aqueous solution is almost neutral, turbid, brown and has a green fluorescence; it dissolves partly in alcohol and in ether, but is completely soluble in a mixture of the two solvents and in benzol, and is almost insoluble in petroleum-benzin. It has been used internally, the odor being partly covered with coumarin or vanilla, but mostly externally in rheumatism, erysipelas, burns, swellings and in various eruptions of the skin; the *ointment* made with petrolatum, contained from 2 to 50 per cent. of ichthyol. Unna administered it to adults in doses of 1 to 2 gm., and favors its internal use in all affections of the skin.

Absorbent wool, a by-product in the manufacture of wool-fat or lanolin, is coming into use as a substitute for absorbent cotton, over which it is said to have the advantage of greater absorbing power for liquids, and of much greater elasticity.

Mercuric phenate, $\text{C}_6\text{H}_5\cdot\text{OHg}\cdot\text{OH}$, is prepared by precipitating in aqueous solution 271 parts of mercuric chloride with 132 parts of

crystallized potassium phenate, and washing the orange-red precipitate, which has only a very faint odor of phenol, and has been given in doses of about .02 gm. ($\frac{1}{3}$ grain).

Collodium corrosivum is prepared by dissolving 1 part of corrosive sublimate in from 30 to 40 parts of collodion (12 to 15 grains in 1 fluidounce). It may be used in those cases where the gradual effects of mercuric chloride are needed, and has been used more particularly for the removal of warts, the application being made once a day.

Collodium antisepticum, which may be used like ordinary cotton, is recommended (*Jour. Mèdec.*, December 26, 1886) to be prepared from powdered mastic 3 gm., powdered narcotine 1 gm., balsam of Peru 1 gm., and chloroform 5 gm. Strips of linen or silk soaked in this solution, form an excellent adhesive plaster.

Oleum cinereum is a mercurial preparation used by Dr. E. Lang (*Wien. Med. Woch.*, 1886) in syphilitic complaints. It is prepared by triturating, in a cool place, lard, oil and mercury until the latter becomes uniformly suspended, the finished preparation to contain 20 per cent. of the metal. It is used as a local dressing; also as an injection to enlarged glands, 0.01 to 0.02 cc. being given once a week or in a fortnight. For use it is melted by the warmth of the hand.

Unguentum cretæ preparatæ is recommended by Dr. Dyce Duckworth (*Practit.*, Jan., 1887) as an application in erysipelas. It is prepared from equal parts of prepared chalk and lard, and to each ounce of the ointment is added 30 grains of carbolic acid. An equally serviceable ointment is obtained with precipitated calcium carbonate, and this is of a pure white color.

Hair Tonic.—The following local application has been recommended by Prof. Bartholow: Fluid extract of pilocarpus and tincture of cantharides, of each, fʒss; glycerin and petrolatum, of each, fʒj. —*Coll. and Clin. Rec.*, May, 1887.

Tilbury Fox uses in incipient baldness a wash composed of tinct. nux vomica, ʒiv; tinct. cantharides, ʒijss; lanolin, ʒijss; acetic acid, ʒiv; and rose water, ʒvj.—*Med. News*, Jan. 8, 1887.

Oil of erigeron has been observed by Dr. Bartholow (*Physic. and Surg.*, April 1887,) to check the waste of albumen, to lessen the irritability of the bladder in cystitis, and to afford considerable relief in bronchial catarrh and similar affections. It was usually given in doses of five drops, every three or four hours.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the AMERICAN JOURNAL OF PHARMACY.

TERPIN is now so largely called for in Paris that unusual efforts are made to supply it. In one of the laboratories, so says the *Union Pharm.* for April, undue haste led to a vigorous explosion. The mixture used in the manufacture consists of 72 litres of the oil of turpentine, 50 litres of alcohol, and 17 kilogm. of nitric acid. The liquid is usually cooled rapidly in stone jars set in water, but as the demand was great, and the jars were all full, a supplementary mixture was poured in a cask, set in cold water, to cool off! The wood did not conduct the heat away rapidly enough, and the explosion was very violent; the cask was driven through the roof, where it burst, scattering its contents throughout the laboratory. No one was injured, strangely enough, but the circumstance contains a lesson for manufacturing chemists to remember. Eyes are valuable to druggists.

NITROUS ACID VAPORS.—A communication has been sent to the Academy of Sciences claiming great success in treating the mucous membranes of the respiratory passages, by a means which most chemists will regard as queer. The remedy consists in pouring fuming nitric acid on a copper plate and inhaling the fumes.

IODINE REAGENTS.—Chibret and Izarn (*Rev. des Sci. Méd.*, April 15), explain a new mode of using Lugol's mixture in seeking for fortuitous alkaloids and leucomaines in human urine—matters in which the wise physician often seeks the aid of the analyst. They found that the unvarying reaction in the presence of alkaloids, gave rise to a green fluorescence, and that this acquires an exceptional visibility under the solar ray or in the lantern. The temperature of the liquid is important. Urine which shows nothing when emitted, gives a clearly perceptible reaction when cold. A concentration of the usual reagent into the following formula gave the best results: Iodine 8; potass. iod. 8; water 10. Urine emitted eight hours after waking, showed five times the quantity of alkaloids found at other seasons, thus confirming Bouchard's observations on the maximum toxicity of alkaloidal urines.

VULCANIZED RUBBER INSTRUMENTS undergo chemical changes which in a few months render them useless. They become roughened, and white spots and patches appear, which gradually extend into the substance of the articles. In the *Jour. de Pharm. et de Chimie*, M. Balland attributes the changes to a very gradual production of

sulphuric acid by means of the moisture in the air uniting with the sulphur contained in the rubber, and, in a previous note, indicated the quantity given off in a chemical analysis in which these instruments were used. The action of the acid upon the instruments can be neutralized by occasional washings with water made slightly alkaline. Drainage tubes treated in this way, five or six times a year, will preserve their elasticity and color. He has remarked the length of time laboratory tubes will last when used as siphons.

DANGER IN SANTONIN, even when given in moderate doses, was reported some weeks since in the *Lyon Médical* to have been observed so frequently that the matter has been inquired into by the *Rép. de Pharm.*, with the following results. The effects of white santonin were more toxic than that which had become yellow through exposure to sunlight, though the latter did not show any diminution in its therapeutic properties. Lawre thinks that the dose for a child of less than two years should not exceed 0.05 gm. In all cases it should be associated with a purgative—calomel, for example—to facilitate its elimination. "Santonin is innocuous or toxic," he says, "in proportion to the rapidity with which it may be eliminated, and this varies in individuals." Lewin and Caspari recommend that it be "administered in oily solutions. In this form it is absorbed by the intestines slowly enough to permit a direct and prolonged contact with the worms."

ESCHSCHOLTZIA.—In the *Bull. Gén. de Thérap.* (April 30), Stanislas Martin advises chemists to make a careful investigation of the *Eschscholtzia californica* in order to separate the unknown active principles to which it owes its calmative action. The character of the sedative effect following the use of *eschscholtzia*, is said to be superior to that of other papaveraceous plants, such as *Sanguinaria canadensis*, *Papaver album*, etc., and, so far as clinical experiments have extended, it seems likely to be preferred to codeine. Martin and Prudhomme will soon enter upon its investigation. American chemists have an opportunity to forestall them.¹

FILTERING PAPER is so often adulterated with sulphate of calcium, says M. Padé in the *Jour. de Phar. et de Chim.*, that analysts should test it carefully. Papers weighing 13.2 gm., gave when incinerated,

¹In 1844 Walz discovered in the root of this plant sanguinarine, and two other alkaloids. The herb contains the two last alkaloids, and in autumn also sanguinarine. Editor AMERICAN JOURNAL PHARMACY.

1.374 gm. of solids constituted chiefly of the lime. A discovery of the fact led to a modification of the official statements concerning the adulteration of wines in France.

VINUM FERRATUM AMARUM.—This preparation forms a component part of a formula which has been largely called for in Paris of late on account of its great success in the treatment of anæmia, especially where the latter is deeply seated and occurs with anorexia. It appears in the *Ann. Clin.* of Masius, as follows: Vini ferrat. am. 120 gm.; Tr. nucis vom. 8 gm.; sol. Fowleri 4 gm. (5i. t. i. d., after eating). The formula for vinum ferratum amarum used in the above is given in *Le Prog. Méd.*, April 9th. American physicians, it is said, are likely to prescribe it. Cinchona bark, 300; gentian, 200; iron citrate, 300; Marsala wine, 11,700; brandy, 900; alcohol, 900; essence of orange, 18; sol. ferric sulphate (10 per cent.), 1800; sugar, 1800; ammonia q. s. The essence, with a little alcohol is mixed with the wine and brandy. With this, macerate the cinchona and gentian until 13,500 gm. have been displaced with water. Dilute the solution of ferric sulphate with twice its weight of water, and add ammonia to excess. Wash the precipitate and let it drain; mix this with the tincture obtained, stirring often, until a yellow color is obtained, which does not darken with tincture of ferric chloride. Then dissolve in it the ferric citrate and the sugar, and dilute to 14,400 gm. Thirty grammes contain 0.60 cinchona; 0.40 gentian and 0.60 citrate of iron.

COLCHICINE. Some very important researches as to the toxicity of colchicine, are given in the *Jour. de Méd.* 1. The symptomatic tables, and the microscopic aspects show that colchicine acts as an irritant poison, powerful enough to make its action felt in all the organs, but whose predominating influence is exerted upon the digestive tract and the kidneys. 2. The minimum toxic dose varies according to the mode of administration. Hypodermically it is 0.000571 gm.; by the stomach, 0.00125 gm. per kilo. of the living body. 3. The toxic action is more rapid in hypodermic injections. 4. It is eliminated by many emunctories—especially by the kidneys—but the work is slow; hence, non-toxic and relatively weak doses (0.00016 gm.) per kilo of body weight, may cause death in five days. 5. It congests the articular extremities and the medulla osseum. 6. In therapeutic doses it acts as a purgative or diuretic (according to strength), in consequence of its congestive and irritative action on the kidneys and the digestive tract. 7. Man is three times more sensitive to its action than cat or

dog. Diuresis is caused by 2 or 3 millig'm. and purgation by 5 millig'm. 8. It augments the excretion of uric acid, and diminishes its quantity in the blood. Its extremely toxic nature suggests great caution in its use.

CONIINE BROMHYDARTE has been used successfully for rheumatismal tetanus. After one injection of 0.0025 gm. of the alkaloid (to a child of ten years,) the trismus diminished greatly, and the violence and frequency of the attacks were lessened after the second dose. After five doses all of the characteristic symptoms ceased. The action of the remedy was especially shown in the relaxing effects on the terminal extremities of the motor nerves. The writer (*Bull. Gén. de Thérap. ; Centralbl. Med.* April 15,) noted a marked diminution of the cutaneous and tendinous reflexes, and in the rapidity and irregularity of the respiration—followed by augmentation of the salivary secretion—after each dose of the medicament. See also AMER. JOUR. PHAR. 1886, p. 357.

EFFECTS OF NARCEINE.—Brown-Sequard and Laborde experimented a good while on the physiological effects of narceine before they found out that "there was something wrong." Then the chemist, Duquesnel, was called in and discovered that the narceine was extremely impure. Pure narceine produces a much quieter sleep than morphine.

COMPOSITE PILLS.—The *Bulletin Commercial*, April, states that Dr. Granville's idea of making "concentric composite pills," i. e., putting the medicaments in layers, so that the outer one will become dissolved in the stomach while the inner drug acts upon the intestine, was invented by Le Couppey, whose pills were exhibited in 1878, and consisted of iron and extract of cinchona separated by a thin layer of sugar, the whole being coated with sugar. Jisy's idea for preserving certain ferrous salts, like the carbonate and iodide, was also a good one; he dried and powdered separately the salts yielding those compounds, mixed them, and at once surrounded them by gelatin in the ordinary way.

FRENCH WINES.—The small vine growers of France now sell their whole product. Wines for their personal use, are made usually from raisins, but they color them just as carefully as though they were to be offered for sale. An effort is being made to stop the sale of wine colorants, and the question arises, "Cannot a Frenchman color wine for his own consumption?"

GLEANINGS FROM GERMAN JOURNALS.

BY GEORGE H. OCHSE, PH. G.

Powdered yellow wax is a good excipient for pill masses containing balsams or ethereal oils. Wax is readily powdered by triturating with an equal quantity of granulated sugar, adding several drops of alcohol. Two parts of this mixture and a small quantity of starch etc., yield with one part of oil or balsam a good, non-voluminous mass.—*Pharm. Centralhalle*, XXVIII—75.

Gelatin Bougies, Suppositories Etc.—The best gelatin for pharmaceutical uses is the French silver gelatin No. 1. The proportions of gelatin, glycerin and water cannot be the same for all preparations because the action of the medicament on the mass, deliquescence or coagulation, must be taken into consideration.

Where gelatin preparations are frequently dispensed it is best to have a definite mass in stock. This is made in large quantities. After removing the scum from the solution it is poured into suitable bottles and when thoroughly cooled covered with alcohol to prevent it from becoming mouldy. When wanted for use the bottle is placed in a water-bath and the required quantity is poured off. The mass is made as follows:—The accurately weighed gelatin is allowed to macerate over night in distilled water and strained through a sieve. The gelatin adhering to the sieve is collected, the whole placed in a tared porcelain capsule and sufficient water added to make the weight four or five times as much as the original quantity of gelatin used. The capsule is placed on the upper ring of a retort-stand and heated over wire-gauze with a gas or spirit-lamp flame, care being taken not to burn the gelatin. The glycerin is added and the whole evaporated to the consistency mentioned in the following table.

	I. Evaporated to 60 parts.	II. Evaporated to 25 parts.	III. Evaporated to 50 parts.	IV. Evaporated to 60 parts.	V. Evaporated to 104 parts.
Gelatin.....	20	10	10	10	30
Water.....	80	40	40	40	120
Glycerin.....	40	15	20	30	15

The anhydrous mass No. 1 is intended for preparations kept in stock, and for those which are to retain their transparency; mass No. 2, for hygroscopic drugs; No. 3, for suppositories; No. 4, for vaginal balls, ear-almonds, and bougies; No. 5, for crayons or bougies, containing a large percentage of iodoform.

Bougies. Bougies containing sulphate of zinc, sulphate of copper, nitrate of silver, extract of opium, hydrochlorate of morphine, bichloride of mercury, etc., are made as follows: one part of sulphate of zinc, or any of the above-mentioned medicaments is first dissolved in a little water, and then added to 99 parts of mass No. IV, and poured into moulds. If it is desired to make a large quantity of sulphate of copper bougies it is best to mix not more than the mould will hold at a time, because by frequently heating the mass the bougies acquire a yellowish-green color instead of a blue-green.

Bougies of carbolic acid (5 per cent.), and similar medicaments soluble in a small quantity of alcohol are made by adding 3 parts of carbolic acid previously dissolved in alcohol to 7 parts of glycerin and 50 parts of mass No. III.

Bougies of iodoform 50 per cent., and of similar medicaments insoluble in water and alcohol by adding 27 parts of powdered iodoform to 54 parts of mass No. V. When taken from the mould the bougies are placed in a drying closet until they weigh about two-thirds of their original weight.

Bougies of ferric chloride (5 per cent.), and of similar hygroscopic drugs by dissolving 1 part of sesquichloride of iron in 9 parts of water, and adding to 19 parts of mass No. II.

Alum bougies (2 per cent.), 25 parts of mass No. III, and 10 parts of distilled water are liquefied in water bath. To this is added a hot solution of 7 parts of alum, 10 glycerin and 5 distilled water. The whole is then evaporated with slight agitation to 35 parts. The mixture becomes thick and turbid on adding the solution of alum, but on heating over a water bath and stirring carefully, the mixture soon becomes clear and transparent. Hot water must be added from time to time to replace that lost by evaporation.

Bougies containing tannin 2 per cent. 0.66 of tannin is dissolved in 8 glycerin, and the hot solution added to 39 mass No. II, the whole evaporated to 33. The mass will coagulate on the addition of the tannin solution, but becomes clear when slowly stirred for 5 or 10 minutes on a water-bath. By this process 2 grams of tannin may be incorporated with 5 grams of gelatin. This formula is a very good one, and yields bougies which are very soluble. Schreiber states that he has met with tannin bougies which, on boiling with water for half an hour, did not dissolve.

Bougies of extract of krameria are not made with gelatin but with

white glue. The requisite quantity of extract is dissolved in 40 glycerin and added to the hot solution of 15 glue in 20 water stirring constantly until the mass is evenly distributed.

Bougies of salicylate and chloride of sodium are made by adding the finely triturated chemicals to 30 parts of gelatin mass No. II.

For *rectal suppositories* mass No. III is used excepting for hygroscopic drugs which require where possible an anhydrous mass, either No. I or No. II.

For *vaginal balls* use about the same mass as is used for bougies. Suppositories or balls containing iodide or bromide of potassium, bromide, chloride or salicylate of sodium or ergotin require mass No. II.

Suppositories of chloral hydrate are made with gelatin mass No. II, the chloral being added dissolved in a little water.—*Phar. Rundsch.* (Prag), 1887, p. 101.

In preparing *solution of acetate of iron* Oldtmann collects the precipitated hydrated oxide of iron on a strainer and allows it to freeze; this mass after melting can be readily washed and pressed. Solution of acetate of iron thus prepared is clear and stable.

Liquor ferri dialysati as frequently obtained has not the proper specific gravity. By subjecting it to freezing temperature the water will freeze out. In this way solution of dialysed iron can readily be concentrated without decomposition.—*Phar. Rundschau* XIII, p. 90.

Reactions for Antifebrin, (Acetanilid).—To test antifebrin for aniline Yvon triturates a small quantity of antifebrin with water and then adds hypobromite of sodium. If the antifebrin is pure the liquid remains clear and has a yellow cast; if aniline is present a red-orange colored precipitate is produced, the liquid becoming the same color.

If antifebrin is heated with mercurous nitrate a green coloring matter soluble in alcohol is produced. This reaction can also be used for testing urine. The urine is shaken with chloroform, the chloroform evaporated and the residue heated with a small particle of mercurous nitrate. If antifebrin is present the green coloring matter is produced.—*Ph. Zeitung*, XXXII, p. 53.

Glycyrrhizate of Quinidine.—Hager prepares this compound as follows:—1000 grams of coarsely powdered peeled licorice root are macerated in 1.5 litres of distilled water at about 40° C. for 12 hours, it is then displaced with a mixture of 1.5 litres of distilled water, 70 cc. ammonia water (10 per cent.) and 15 grams of bicarbonate of ammo-

nium and lastly with distilled water until the liquid has a pale yellow color and scarcely perceptible, sweet taste. The mixed liquids if turbid (owing to the presence of carbonate of calcium) must be filtered. To the filtrate is added by agitation a solution of 75 grams of sulphate of quinidine in 500 cc. luke-warm distilled water and 300 grams of hydrochloric acid sp. gr. 1.124. If after the lapse of one hour the solution should have a strong alkaline reaction it must be neutralized with dilute acetic acid. It must be stirred frequently and then put aside for several hours. The precipitate is collected on a wetted linen strainer and washed with cold distilled water, gently expressed and spread on porcelain plates in layers about 1.5 cm. thick and only covering one-half of the plate. The plates are placed in a slanting position so that the liquid can drain off. When dry it is powdered in a cold porcelain mortar. The yield is about 200 grams. Thus prepared glycyrrhizate of quinidine is a grey-yellow powder, of a bitter-sweet taste, insoluble in water and sparingly soluble in alcohol. Acids and alkalis decompose it. Its composition corresponds to the formula $C_{20}H_{24}N_2O_2 \cdot C_{44}H_{63}NO_{13} + 2H_2O = 1577$. It contains 41.09 per cent. quinidine.—*Ph. Zeitung*, XXXI, 641.

ESSENTIAL OIL PAPERS.

BY ALBERT M. TODD.

2. OILS OF ERIGERON AND FIREWEED.

The oil of erigeron (*oleum erigerontis canadensis*) and the oil of true fireweed, (*oleum erechthitis hieracifoliæ*), are distilled from plants of the most distinct types possible, and seem to be almost as distinct in therapeutic action; both are highly valuable in medicine when pure, but their usefulness has been nearly destroyed and their value little understood since they have been almost universally confounded with each other, both in science and commerce, and even when not so confounded are rarely met with in a state of purity.

A growing interest being manifested in the subject, I had already made some observations with the oils referred to, which interest was further enhanced by an urgent request from Messrs. J. U. & C. G. Lloyd, that I should make more complete investigations, the results of which might be embodied in their valuable work now in progress on the "Drugs and Medicines of North America." I also

had the pleasure of sending them a full collection of our essential oil plants in the living state, with which to embellish their work; and through their courtesy the plate of fireweed prepared for that purpose, is here shown.

As no tests existed for the identification of the oils, and possessing, fortunately, samples distilled by myself directly from the plants, so that I was able to be positive as to their purity, which is a condition of vital importance; the investigations recorded were made.

The credit of the first researches is due to Prof. J. M. Maisch, which happened through a curious circumstance—that the fields of peppermint had been reported to be contaminated with a weed called “fireweed.” This error was the fault of the farmers, who, from a lack of botanical knowledge, gave the wrong name for the plant. Prof. Maisch rightly believing that the contaminating weed was the *erigeron canadense*, corresponded with various peppermint growers, sending them botanical specimens, that there should be no mistake; which correspondence and specimens I had the pleasure of seeing. The correction of the error was then for the first time made public by Prof. Maisch in an article in the AMERICAN JOURNAL OF PHARMACY for 1870, page 120, as well as in the report on the progress of pharmacy in the proceedings of the Am. Pharm. Assoc. for that year.

The principal object sought in the present article is to establish tests for the identification of the oils rather than to treat of the botany of the plants; but a crude description regarding their general characteristics may be of interest.*¹

The true fireweed—*Erechthitis hieracifolia*—is seldom found in open fields or by the roadside, growing exclusively in, or adjacent to, clearings where timber has recently been burned. The plant strangely seems to spring spontaneously from the ashes of old log piles soon after their formation, and continues to sprout up for several seasons there-

¹ A more scientific description of the plants in question may be found in Gray's Hand Book of Botany, as follows:

Erechthites hieracifolia, Raf. (Fireweed.) Often hairy; stem grooved (1° to 5° high); leaves lanceolate or oblong, acute, cut-toothed, sessile; the upper with an auricled clasping base. (*Senecio hieracifolius*, L.)—Moist woods. Common, especially northward, and in recent clearings, where the ground has been burned over; whence the popular name. July–Sept.

½ *Erigeron canadense*, L. (Horse-weed. Butter-weed.) Bristly-hairy; stem erect, wand-like (3°–5° high); leaves linear, mostly entire; those from the root cut-lobed; heads very numerous and small, cylindrical, paniced. Waste places; a common weed, now widely diffused over the world. July–Oct. Ligules much shorter than their tube, white. (Nat. in Eur. etc).

after. Its height varies from two to six feet, having a single stalk with a diameter of from three-fourths to one and one-half inches, and a bright green leaf from one to two inches in width and from three to eight inches in length. Its flowers appear only near the top, and when mature, are covered with fine white down, much resembling that of the common thistle, which is carried by the wind to a great distance. The effect of the maturing of the plant and its coming into flower is so marked that the yield of essential oil is decreased thereby within a single week fully 50 per cent.; and indeed, if the plant is not cut promptly at maturity, the yield of essential oil is only about one-third of what it would have been two weeks preceeding. The fireweed plant has a most thrifty, robust and glossy appearance, and is never seen in the peppermint plantations, excepting in the rarest instances, and then is usually found growing singly.

The *erigeron canadense* is entirely distinct in its nature, growing almost entirely in open stubble fields and "summer fallows," and along the roadside, its stalks scarcely ever exceeding a half or three-fourths inch in diameter, and the leaves scarcely a half inch in width, and two or three in length. Its flowers are very minute, and are distributed more uniformly over the surface of the plant. *Erigeron* is much richer in essential oil than fireweed, the former sometimes yielding over 20 lbs. of essential oil to a charge of 2000 lbs. of plants. The yield of fireweed seems to average about 50 per cent. of that of *erigeron*, the plants being distilled under like favorable conditions.

Now as to the characteristics of their essential oils: Unfortunately, most of the physical tests, and the reagents usually employed in such analyses do not give as widely varying results between these, as between most other oils; but when submitted to spectral analysis, I find fortunately, a test which is quite decisive, and this accordingly has the greater prominence; but others more easily operated and equally as certain, *if due precautions are taken*, are also given.

First, eight samples of natural oil of *erigeron* were operated upon, (the natural oil being taken, as it is this quality which has hitherto been mostly known in commerce.) For the purpose of showing the relationship between specific gravity and polarization, these two tests are given in conjunction with each other. The polariscope used is a "Mitscherlich," with a perception tube 200 mm. in length, made by De Sage of Heidelberg, being the instrument referred to in the first article of this series, (in the April No. of the *AMERICAN JOURNAL*



OF PHARMACY); the temperatures for sp. gr. and boiling points were taken by a thermometer specially treated at Yale Observatory¹.

NATURAL OIL OF ERIGERON.

No.	Sp. Gr. at 15° C. 59° F.	Polarizing Angle.
1.....	.870 (resinous.)	—60°
2.....	.864	—51
3.....	.856	—23
4.....	.865	—58
5.....	.864	—51
6.....	.861	—30
7.....	.864	—47·5
8.....	.865	—57
<hr/>		<hr/>
Totals.....	6 909	377·5

Dividing totals by 8 gives average polarization of —47·19, and sp. gr. .8636.

Having five samples of the oil of fireweed of my own distillation, they were submitted to like tests at the same temperature, with the following results :

No.	Sp. Gr.	Polarizing Angle.
1.....	.858.....	— 4
2.....	.854.....	— 3·5
3.....	.847.....	+35·5
4.....	.905 (resinous).....	+33
5.....	.907.....	+44
<hr/>		<hr/>
Totals,	4·366	+110.

Dividing by 5 gives average polarization of +22 and Sp. Gr. .8732.

It will be noticed that the fireweed polarizes with wider variations than does the erigeron, yet fortunately in no case within the limitations of the former; the two most nearly approaching each other being No. 1 fireweed and No. 3 erigeron, which still show a difference of 19° while the average difference, as will be noticed, is 69·19°. It will also be seen that sample No. 3 of erigeron gives not only the lowest polarizing angle, but is also the lowest in sp. gr., and this seems to hold good in nearly all the essential oils the spectral analysis of which I have undertaken. This I found to be caused by the resin

¹ The importance of having thermometers in chemical analyses, which have been standardized and corrected by the astronomer of Yale Observatory or some other equally reliable authority, cannot be over-estimated. The writer has found that many finely constructed and expensive thermometers which he had formerly placed much confidence in, after having been used for some time in chemical work, had their readings changed fully 10° C. (18° F.), rendering them unfit for use. Thermometers corrected and standardized can be obtained at prices ranging from \$5 to \$10.

which had formed in the oil by oxidation. This resin is opaque and cannot of course of itself produce an optical test, but when added to the oil increases its optical activity. This discovery was verified by the fact that all rectified samples, except in the cases hereafter referred to, were found to have less rotatory power than the original oil operated upon. This phenomenon was noticed when pipmenthol and menthol, both of which were found showing no distinct polarization, are added to oil of peppermint, the rotatory power being increased the same as with the addition of the opaque resin.

By the tests given above it will be noticed that the average of the sp. gr. of the fireweed samples is .0096 greater than the average of the erigeron; but this is accounted for by the fact that Nos. 4 and 5 of the fireweed were extremely resinous; whereas quite the reverse result is obtained when samples of the oils are compared under like conditions of oxidation. This should be borne in mind as having an important bearing on the test. It was found that when samples of the oil in like conditions either of freshness or oxidation, were examined, that the sp. gr. of the fireweed was about .012 less than that of erigeron; and upon submitting the oils to fractional distillation and taking a like number of fractions of both, the sp. gr. of the fireweed was about .011 less than the erigeron.

To find the varying characteristics of the products obtained by fractional distillation, careful distillations were made by diffusion or steam, the distillate being divided in each case in 20 fractions by weight, the process being continued as slowly as practicable, that the fractions should present as distinct characteristics as possible.

In the distillation of erigeron, 100 pounds of natural oil was used, the polarizing test of which was, — 50.5° . After 18 full fractions of 5 pounds each had been recovered, it was found from the slowness with which distillation progressed, and the high color and sp. gr. of the distillate, that but little more could be obtained; but the process being continued for a long time with increased power, 3 pounds more were obtained for the 19th fraction [93 pounds in all.] The remaining 7 pounds which was not recovered, was drawn from the still mixed with the water which had condensed therein, and separated, when cooled, into a solid resin of a dark reddish brown color.

In the rectification of the fireweed, divided in like manner, 18 full fractions only were obtained, the portion representing the last two fractions forming also a solid resin; but that of the fireweed was of a

light straw color. Upon submitting the different fractions to the sp. gr. and polarizing test, the following results were obtained:

ERIGERON.			FIREWEED.		
No. of fraction.	Sp. Gr. at 15°C.	Polarization.	No. of fraction.	Sp. Gr. at 15°C.	Polarization.
1.....	·8598	+10	1.....	·825	—4
2.....	·860	+13	2.....	·82575	—4
3.....	·862	+15	3.....	·8263	—4
4.....	·862	+15	4.....	·8268	+1
5.....	·86225	+15	5.....	·827	+5
6.....	·86225	+15	6.....	·8273	+4
7.....	·86225	+15	7.....	·8275	+4
8.....	·86225	+15	8.....	·8255	—2
9.....	·86225	+14·5	9.....	·8267	0
10.....	·86225	+14	10.....	·8269	+1
11.....	·86275	+12·5	11.....	·8277	+1
12.....	·8628	+12	12.....	·8282	+1
13.....	·8629	+11	13.....	·8292	+4
14.....	·8635	+8	14.....	·831	+5
15.....	·865	0	15.....	·840	+2
16.....	·8672	—3	16.....	·8568	—9
17.....	·8684	—35	17.....	·888	—53
18.....	·9169	—43·5	18.....	·919	—85
19. 3 lbs..	·9388		19.....	Resin	
20. 7 lbs..	Resin		20.....	Resin	

It will be noticed that the same phenomenon occurs in the fractional distillation of fireweed, as that which the writer discovered in oil of peppermint, recorded in the Proceedings of the American Pharmaceutical Association for 1885, vol. 33, page 579, and farther mentioned in vol. 34, page 129), viz: That after several fractions have been recovered in which the sp. gr. constantly increases, there is a point found near the middle of the distillate (which in this case occurs in the 8th fraction) where the direction is changed to a decreasing one. In the case of fireweed, however, there was but one fraction which showed the decreasing tendency, although fraction 9 as well was lighter than fraction 7. When peppermint is divided in the same manner, there is a greater number of fractions showing this phenomenon. It is also a remarkable fact that the polarizing test is similarly affected at this stage, as the polarization is also changed from + 4 to — 2.

None of the fractions of *erigeron* show this change from *rising* to *falling* gravity; but it will be noticed that there is a *tendency in that direction*, as the fractions from 5 to 9 inclusive *remain stationary* rather than rising, while in both there is a rapid increase in the last fractions.

Taking now the eighteen fractions of each oil united in equal parts by weight, the following results were obtained :

ERIGERON.		FIREWEED.	
Temperature F.	Sp. Gr.	Temperature F.	Sp. Gr.
40°	.878	40°	.867
60°	.86975	60°	.85925
80°	.8603	80°	.8501

It will thus be seen that the rectified fireweed is about .011 lighter than erigeron. In this test, however, the last 3 pounds obtained from the erigeron was not used, being rank in odor. Had this been used to fairly represent the fresh oil in a state of purity, it would have raised the sp. gr. about .001, so that it is safe to say that the density of fireweed under the same conditions of freshness as erigeron, is about .011 to .012 lighter.

It will be noticed that the first 15 fractions of fireweed average about .035 lighter than the same fractions of erigeron. Fractions 16 and 17 when united are about equal. The 18th fraction of fireweed is somewhat heavier than the corresponding one of erigeron, and nearly though not quite so heavy as the equivalent last portions obtained from the erigeron when proportionately united.

A distinct test, and easy in the hands of the pharmacist, is here obtained ; that when erigeron is fractionally distilled in the presence of water and divided in fractions either of 20 or 2, the first portion recovered will not vary from .860. When fireweed is treated in like manner, the first portion (no matter how many the fractions) will not be far from .826. And this wide difference is certainly sufficient to identify the one from the other.

As a phenomenal feature in the polarization of the fractions of erigeron, it will be noticed that while the oil originally operated upon was strongly levogyre (polarizing — 50.5°) the first 14 fractions are actively dextrogyre, and the 15th neutral ; with the 16th a levogyre rotation is shown of 3°, which tendency is rapidly augmented in the 17th fraction by an increase of 32°, finally reaching in the 18th a point — 43.5. These 18 fractions when united polarize at — 28.5. The first 3 fractions from oil of fireweed are levogyre ; the rotation changes in the 4th to dextrogyre, which is continued until the 8th fraction is reached, when the left-handed rotation again occurs. The 9th is neutral ; with the 10th the dextrogyre rotation is shown, which is continued until the 16th, when the direction is suddenly changed again to the left by a reversion from + 2 to — 9. The rotatory activity in

the 17th fraction is *rapidly augmented* the same as in the erigeron, but in a still more marked degree, rising from -9° to -53° . In the 18th fraction a remarkable polarization of -85° takes place, being the highest yet noticed in an essential oil.

Boiling Points.—In making this test, 20 cc. of each oil were placed in a test tube, immersed in an oil bath of ordinary temperature and slowly heated¹. When the bath had attained a temperature of 340° the boiling began slightly in the fireweed at 331° ; the bulb of the thermometer being immersed in the liquid, as there was not sufficient vapor to give a good indication. Within the space of a minute the temperature of the oil rose to 360° , boiling violently. The temperature of the vapor was found to be 358° . By applying more heat and raising the bath to a temperature of 410° , the oil attained a temperature of 370° with the vapor at 365° . On continuing the boiling for some time, it was found quite difficult to increase the temperature more than 3° . It was not found that the oil had evaporated to the extent of 5 per cent., so that the boiling point of the vapor of fireweed during the progress of the distillation of the first 5 per cent. is mostly between 358° and 365° . The oil used in the above test was the natural oil of fireweed used for the rectification mentioned.

In oil of erigeron at 340° slight ebullition was shown, the thermometer immersed in the oil. At 347° boiling progressed vigorously with the vapor at 342° . Continuing the boiling four minutes, the temperature of the vapor had risen to 347° , at which it was practically constant.

From this it will be observed that the boiling point of the fireweed-oil under the same circumstances is about 18° to 20° higher than that of the oil of erigeron.

Chemical Reactions.—This branch of investigation was unfortunately quite unfruitful, both oils fulminating vigorously with iodine, yet with less violence than spirit of turpentine. Upon adding to 50 drops of each oil from one to three drops of nitric acid alternately, (sp. gr., 1.2), there were no special colors produced, the only effect being that in eight hours the erigeron had changed to a dark straw color, the fireweed being of a medium brown. (In the case of peppermint a beautiful spectral effect is produced.)

¹ This precaution of immersing the oil under analysis in a bath at a temperature below its boiling point is important, as more exact and uniform results can be obtained in the earlier stages.

Treating the oils in the same way with pure sulphuric acid, the fireweed changed within thirty minutes to a very dull brown, the erigeron to a bright red color.

Upon moistening chloral hydrate with the oils, there was very quickly produced in the erigeron a delicate green tint, which remained permanent for some time. With the fireweed a similar but less delicate tint was produced, disappearing however, within a few minutes. (Peppermint produced with chloral hydrate a beautiful rose.)

Further, as to physical characteristics, both oils are quite alike in oxidation, since resin is formed rapidly within both upon exposure to air. There is fortunately a distinguishing characteristic in the resin of the two oils, that of erigeron being a deep brown red, imparting its color to the oil. The oxidation of fireweed has but a slight effect on its color; indeed, as has been stated, its resinoid when separated is of itself light in color. Both the oils, when oxidizing, deposit a layer of resin upon the sides and bottom of the bottle, differing in this respect greatly from peppermint, which holds the resin suspended in the oil.

One other interesting phenomenon was observed which I will mention in closing. This happened in the last pound obtained in the rectification of 100 lbs. erigeron. The bottle containing the same was set aside during the month of November last for future investigation, remaining in a cool room, but exposed to the action of the light during the winter. In the meantime a delicate formation had spread through the oil somewhat resembling the aquatic form of life known as the sea-urchin. An effort was made to separate this from the oil, and had due precautions been taken by maintaining the same temperature throughout the process, the separation might have been accomplished; but the structure being extremely delicate, was dissolved and lost. The same bottle is still retained with the hopes that the formation may again appear, when an effort will again be made to separate it.

From the experiments made in the foregoing, the following comparisons between the two oils may be made, and the following conclusions drawn:

1. Polarization. Pure oil of erigeron in the natural state should not polarize nearer the zero point than — 26, nor farther than — 60; rectified oil freed from resin may polarize some nearer the zero point than the limit given, and the first fractions should be dextrogyre. Pure

fireweed if lævogyre should not polarize farther than -4 , and if dextrogyre farther than $+4$.

2. Specific gravity. Pure natural oil of fireweed unless resinous (which may be noted by leaving a stain upon paper when evaporated) should not possess a sp. gr. above $\cdot855$, nor below $\cdot845$; and erigeron under like circumstances not above $\cdot865$, nor below $\cdot855$. The difference in sp. gr. being about $\cdot010$.

3. Boiling point. The temperature of the *vapor* being taken, fireweed should not vaporize to any marked extent below 355° ; nor should this temperature be increased more than 10° F., until five per cent. of the oil has been evaporated. Erigeron should not boil vigorously below 342° F., nor above 347° F., until five per cent. has been volatilized.

4. Resinoid. When distilled with water or steam, the resinous product of erigeron is a deep reddish-brown; that of fireweed a light straw color. The effect of rectification by steam with both is to produce a brilliant and colorless oil. Both oils possess characteristic odors. As these cannot be well described, I may find occasion to comply with the requests made that samples of both shall be furnished the different pharmaceutical colleges and associations of the country, where those interested may have an opportunity of comparing for themselves both oils in a state of purity.

The investigations recorded are, by no means, considered complete or sufficient, and it is hoped that farther research will develop some tests which may be both efficient and easy of application. The need is evident from that fact that the writer has not been able to find in the hands of a pharmacist, except in the rarest instances, a sample of the oil of true fireweed, which showed by its odor even a trace of the oil.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, May 17th, 1887.

At the last Pharmaceutical Meeting, session 1886-87, Vice-president Wm. J. Jenks presided. The minutes of the last meeting were read and approved.

The registrar reported that the following books had been received for the library: Report of the Commissioner of Education for 1884-1885; Epitome of the Newer Materia Medica, issued by Messrs. Parke, Davis & Co., of Detroit; and the fourth volume of the Report of the Bureau of Ethnology, by J. W. Powell, issued under the auspices of the Smithsonian Institution.

Fifteen specimens of Chinese Materia Medica were exhibited, illustrating a paper on this subject published a short time ago in the *Medical and Surg. Reporter* of this city, by Stewart Culin.

A paper upon Bechi's test for *cotton-seed oil* was read by Jos. W. England, Ph. G., who also exhibited a number of different oils, pure and mixed with cotton-seed oil, illustrating the effect upon them of the reagent proposed by Prof. Bechi.

Prof. Maisch said that in testing for the purity of olive oil, he had relied mainly upon two reagents, strong sulphuric acid and a cold mixture of sulphuric and nitric acids; both these reagents, when dropped to the oil upon a white plate, would scarcely change the color of pure olive oil, but with cotton-seed oil or several other cheap oils would produce a red or brown color; while thus an adulteration was shown, these test liquids would not identify cotton-seed oil. This is done by Bechi's test and this gives it its great value as cotton-seed oil is the main adulterant of olive oil at the present time, but probably not the only one since the sample of olive oil imported in Florence flasks was shown by Mr. England to be free from cotton-seed oil; but it acquired a red color with the acid test.

Prof. Remington said that olive oil is now used almost as a mere flavoring material to the cotton-seed oil, such is the extent to which this fraud is carried; the amount of cotton-seed oil exported to Europe is somewhere near 20,000,000 gallons for which there is no ostensible use, except that of mixing with olive oil.

Prof. Trimble said that while the subject of mixing oil and decolorizing was being discussed it might be stated that mineral oil, one of the recent sophistications of castor oil, was deprived of its fluorescence by adding a small quantity of *nitro-naphthalin*.

Mr. England stated that Prof. Maisch had suggested that the reaction by Bechi's test upon cotton-seed oil was probably due to the yellow coloring principle.

Prof. Maisch said that a method of destroying this coloring matter which persistently remains with the oil and even with the soaps prepared from it, had been a study for many years among European investigators and as yet no satisfactory process had been devised.

Mr. Webb stated that in the last revision of the pharmacopœia, cotton-seed oil had been directed in place of olive oil in making *linimentum ammoniæ*, and that it was a failure, the liniment thus made being a thin unadhesive preparation quite unfit for the purpose designed.

Prof. Remington stated that a low grade of olive oil suitable for liniments, could easily be obtained. This green and almost always rancid oil was obtained by racking off the oil from the settlings of the oil vats, and sold as *commercial olive oil*; being very cheap it don't pay to adulterate it. He said that about this time last year he went through the oil producing districts of southern Europe, and the methods of making the oil were of the most primitive kind; an old press turned by two or three men forced the oil out from the olives, and so dirty and common a process was it, that he felt little disposition to indulge in olive oil since. There is something in cotton-

seed oil that when it is subjected to heat gives rise to acrolein products which render all substances cooked with it disagreeable to the taste and injurious to the stomach; whether this is connected with the coloring matter or not is as yet an unascertained fact. But the coloring matter of cotton-seed oil which may probably be of a resinous nature, is a source of great trouble in a commercial way and prevents its use in making white soaps. The soap may be white for a time, but in a few months brown spots develop, and finally the whole material looks so badly that it can only be sold by working it over into a colored soap. There is a very handsome fortune for the discoverer of some efficient and practical method of accomplishing the removal of this matter.

Mr. Frank X. Moerk read a paper upon *subiodide of bismuth*, and showed a number of samples made by different processes. Mr. England stated that the use of this substance was increasing; it is used as an antiseptic like iodoform, and is also given internally in the form of emulsions in doses of five to thirty grains.

Mr. Steinmann read a paper upon *colorless solution of hydrastis*, and Mr. Clarkson, one upon *cacao shells*, of which no analysis appears to have been published. The use they are put to, that of adulterating spices, led to a discussion of the subject, one of the members stating that "ground black pepper" had been offered at two cents per pound, and inquiry elicited the formula by which it was manufactured; 90 pounds dried bread, and 5 pounds each of charcoal and black pepper were ground together. Another member stated the mouldy ship bread which came back from sea voyages was bought up for this purpose.

Professor Trimble read a paper entitled *Laboratory Notes*, giving the results of various analyses made by different students in the laboratory during the last winter. Prof. Maisch inquired whether the amount of ash was calculated on the air dry or exsiccated drugs, and it was stated that the air dry articles were used. Professor Maisch exhibited a specimen of expressed oil of mustard seed made by him 23 years ago, which had remained sweet till a short time since.

Prof. Trimble read a paper upon *acetate of amyl*, or pear oil, as it is termed. It is now largely used as a menstruum for dissolving gun cotton, for which purpose it does not need to be purified with the care that the pear oil used as a flavoring essence is; the latter is worth \$2.50 per pound, while the cruder article can be had for that much per gallon.

Mr. England stated that in one of the Italian journals a very inexpensive process was reported.

Professor Remington said that a California doctor called on him lately, and showed him a root which he was sure could be made to yield a fortune if made into a patent medicine; the root was quite aromatic, and reminded him of lovage or angelica. Professor Maisch said that the small sample shown had the characters of *osha root*, which, twenty years ago, attracted some attention, and which was derived from an undetermined umbelliferous plant.

Prof. Remington read three prescriptions sent to him from Canada by

one of our late students; they were so complex as to remind one of the formulas in vogue some two or three hundred years since, about twenty-five or thirty different substances being thus mixed up.

Prof. Maisch read *notes on a few drugs*, giving the results of a number of examinations of different substances made by Mr. Geo. M. Beringer.

Mr. Boring asked what the status of the apothecary was under the *high license law* lately passed. No one present appeared to be sufficiently familiar with the new law to reply to the query; but it was stated that the law was not operative till January 1st, 1888.

Inquiry was also made in regard to the *State pharmacy law*. It was not known whether the law had passed both houses, and it was stated that the clause requiring graduates in medicine to have at least three years experience as apothecaries to entitle them to registration, which was recently struck out by the Senate, left the bill in such a shape as to permit the registration as pharmacists, of physicians, without requiring of them pharmaceutical experience, or an examination testing their competency, while previous to registration, an examination before the board was required of all graduates of colleges of pharmacy without regard to the length of time they had spent in pharmaceutical establishments, the lowest limit being four years.

There being no further business the meeting adjourned.

THOS. S. WIEGAND, *Registrar*.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

The Albany College of Pharmacy held its sixth commencement March 8th, the graduating class numbering 18. Valedictory address by J. J. Barton.

The Chicago College of Pharmacy held its annual meeting March 8th, at which the following officers were elected: George Buck, president; W. K. Forsythe, vice-president; D. H. Galloway, secretary; W. A. Puckner, auditor, and J. S. Jacobus, treasurer. Ten members of the board of trustees were likewise elected.

The Alumni Association, Cincinnati College of Pharmacy, at its annual meeting, March 30th, inaugurated a series of social entertainments, and made arrangements for the reading of papers at the quarterly meetings. Mr. A. W. Bain was elected president, H. Serodino, secretary, and Emil Heun, treasurer.

The Illinois College of Pharmacy held its first commencement in February with a graduating class of ten.

The Louisville College of Pharmacy held its commencement March 10th, the graduating class numbering eleven. Gold medals were awarded to W. M. Reed for best examination, and to E. R. Constantine for the best thesis.

Alumni Association, New York College of Pharmacy. The officers elected at the annual meeting March 24, are: C. F. Heebner, president; Wm. Wright, Jr., A. Stover and A. L. Metz, vice-presidents; G. A. Palmer, secretary, and L. M. Royce, registrar.

The National College of Pharmacy at Washington, D. C., had a graduating class of twelve, the commencement exercises having taken place May 5.

The Pittsburgh College of Pharmacy had its commencement March 15th, with seven graduates. Examination prizes, consisting of a gold and a silver medal, were awarded to W. C. Gordon and G. B. Little. Prof. S. H. Stevens delivered the valedictory address.

The St. Louis College of Pharmacy held its twenty-first commencement March 17th, with a graduating class of 44. A gold medal for highest proficiency was awarded to E. E. Hunter; a copy of the National Dispensatory for the most meritorious thesis, to A. H. Sippy; a set of scientific books for the best chemical laboratory work, to V. J. Mueller; and the junior students prize, the National Dispensatory, to J. G. Vogt, M. D. Professor Curtman delivered the valedictory address.

At the annual meeting held April 25, Mr. C. F. G. Meyer was elected president; Louis Schurk, vice-president; G. H. C. Klie, recording secretary; H. M. Whelpley, corresponding secretary, and S. Boehm, treasurer. It has been decided to enlarge the college building during the summer.

The Alumni Association, St. Louis College of Pharmacy held its eleventh annual meeting February 15, and elected the following officers for the ensuing year: W. C. Bolm, president, Wm. H. Gallenkamp and Wm. H. Motz, vice-presidents; H. M. Whelpley, recording secretary; F. F. Witting, corresponding secretary; Chas. Geitner, treasurer; Albert Weber, registrar. Messrs. J. W. Tomfohrde and Thos. A. Buckland, Jr., were elected to fill vacancies in the Executive Board.

The Connecticut Pharmaceutical Association held its eleventh annual meeting at Meriden, Feb. 1st and 2nd. The total membership was 252. Balance in treasury \$1221.64. Eight active and two honorary members were elected. A number of papers were read on chemical and pharmaceutical preparations made by some of the members and placed on exhibition, during the meeting, no other exhibition being held at the same time. The officers for the present year are: C. W. Whittlesey, New Haven, president; J. O. May, Naugatuck, and J. H. Parker, Meriden, vice-presidents; F. Wilcox, Waterbury, secretary, and L. H. Goodwin, Hartford, treasurer. The next meeting will be held in Willimantic, February 7, 1888.

Georgia Pharmaceutical Association. The twelfth annual meeting took place on Cumberland Island April 12. A number of papers were read, and the Rankin prize of \$20 for the best paper was awarded to H. R. Slack, Jr. The establishment of a College of Pharmacy in connection with the new school of technology in Atlanta was discussed, and Messrs. Schumann, Rankin and Stanford were appointed a committee to further the plan. Geo. D. Case, Milledgeville, was elected president; F. A. Cheatham, Macon, W. B. Shuptrine, Savannah, and C. H. Behre, Atlanta, vice-presidents; H. R. Slack, Jr. secretary, M. H. Taylor, Macon, treasurer, and W. S. Parks, Atlanta, local secretary, the next meeting to be held in Atlanta July 10, 1888.

Louisiana Pharmaceutical Association. The fifth annual meeting was held in New Orleans April 13 and 14. Among the papers read were the following:

On syrup of ferric oxide; indigenous medicinal plants; on tobacco and on gelsemium. The endeavor to secure the enactment of a pharmacy law for the State was not successful, but the efforts will be continued. It is contemplated to establish a College of Pharmacy in connection with the medical college of Tulane University. The officers elected for the ensuing year are: C. L. Keppler, president; W. Carson and J. C. Godbold, vice-presidents; L. F. Chalin, secretary; L. B. Lavigne, treasurer; and Mrs. E. Rudolph, corresponding secretary. The next meeting will again be held in New Orleans April 11, 1888.

Nebraska State Pharmaceutical Association. The sixth annual meeting was held in Omaha May 10-12th, President James Reed in the chair. The usual reports of officers and committees were read, and considerable prominence was given to the pharmacy law which was recently passed, and a resolution was passed without a dissenting vote, requesting the Board of Pharmacy to recognize diplomas of reputable Colleges of Pharmacy requiring four years' practical experience.

The membership exceeds 500, about 120 having been elected at this meeting.

Papers were read on "pharmaceutical education," by Rob. J. Brown, and on "commercial pressed herbs," by H. D. Boyden. Honorary members were elected as follows: R. J. Brown, Leavenworth, Kan., and Professors P. W. Bedford, J. M. Maisch, J. P. Remington, S. P. Sadtler and O. A. Wall.

The officers for the ensuing year are: M. E. Schultz, president; C. H. Bruner, P. C. Corrigan, W. B. Shryock, W. P. Haller and W. P. Hughes, vice-presidents; C. J. Daubach, secretary; J. Forsyth, treasurer, and W. C. Lane, local secretary. The next meeting will be held at Lincoln, May 8th, 1888.

EDITORIAL DEPARTMENT.

Retirement of Professor Robert Bentley.—At the meeting of the Council of the Pharmaceutical Society of Great Britain held May 4th, a letter from Professor Bentley was read intimating his intention to resign the professorship at the termination of the present session. Action on this communication was deferred to a subsequent meeting.

Mr. Bentley was a student in the School of the Pharmaceutical Society, and at the examination in 1842 was awarded the single prize then offered by the Society. While Lecturer on Botany at the London Hospital in 1849, he undertook also to finish the course of lectures on the Society's School, interrupted by the illness and death of Prof. A. T. Thomson, whose successor Mr. Bentley became in the same year. When, in July 1851, Prof. Pereira retired from the chair of *Materia Medica*, Mr. Bentley was appointed Professor of *Materia Medica* and Botany, the two courses being united into one. In this capacity he has labored to the present day.

In the United States Professor Bentley is known as a teacher mainly by reputation; but his literary labors are very generally known, more particularly his excellent "Manual of Botany," and the voluminous work on "Medicinal Plants," which he issued jointly with Prof. Henry Trimen.

The Pennsylvania Pharmacy Bill has been signed by Governor Beaver May 24th. We have not been able to procure a correct copy of the new law in time for publication in the present number of the JOURNAL; but we learn that the clause, which as stated in another place, had been stricken out by the Senate, requiring physicians desiring to be registered as pharmacists without examination, to have had not less than three years continuous practice in pharmacy, has been restored by the conference committee of the two Houses. Whilst thus the law is less objectionable than it had been made by the Senate, still the fact remains that—as far as we know—no other state and no other country enjoys a pharmacy law totally ignoring pharmaceutical education, and declaring as superior to it, for the purposes of practising pharmacy, a medical education supplemented by a few years of shop-experience. Whether Pennsylvania has reason to be proud of this achievement, is a question, in answering which no argumentation is needed.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Atlas Manuel de l'Histologie des Drogues simples. Par J. Godfrin, Professeur à l'École supérieure de Pharmacie de Nancy, et Ch. Noël, Préparateur à la même École. Paris: Librairie F. Savy. 1887. 4to.

Hand atlas of the histology of simple drugs.

This atlas consists of 45 plates, each containing representations of two or more drugs, mostly in transverse sections, and magnified to such a degree that the elements of each tissue may be seen in their various details. The first two plates, containing the starches and other pulverulent drugs, are followed by nutgalls, cryptogamous drugs, woods, barks, rhizomes, roots, leaves, flower-buds, fruits and seeds. The figures are reproduced partly from drawings and partly as phototypes, and are faithful representations of the sections as seen under the microscope. Each plate is accompanied by brief explanations of all the details observed in each figure.

It has been the desire of the authors to place into the hands of pharmacists, and particularly of students, a practical work illustrating the anatomical structure of frequently-used drugs, and serving at the same time as a manual for the general histology of *materia medica*. In making the selec-

tions such drugs have mainly been chosen which present some interesting anatomical characters, or which are liable to substitution or adulteration. The number of drugs illustrated must, therefore, obviously be limited, and the selection is not confined to such as are recognized by the Codex. Of the cinchona barks, necessarily several species had to be admitted, and in addition is found also the important cuprea bark, as well as the bicolorata bark, which latter is now almost unknown in the United States. This must also be said of the nux vomica bark, which is still quoted in works of reference as false angustura bark, but rarely, if ever, seen in our commerce. Podophyllum, which has found its way into most modern pharmacopœias, has received a place in this work, and so has likewise the comparatively recently introduced cascara sagrada, which, thus far, is recognized only by the British Pharmacopœia; but senega has been omitted, though its particular structure makes it a subject of interest to the student of materia medica. Other omissions of a similar nature might be mentioned; but it must be remembered that the scope was intended to be limited, and it must be granted, that with few exceptions, the illustrations are equally interesting and practically useful to the American student, as they appear to be for the French. For these reasons the work deserves to become known and used also in the United States. The authors state that in having recourse to the most simple processes of reproduction, they have aimed to preserve the simplicity and clearness of the designs, preferring rather to sacrifice their artistic value; but the latter has not been lost sight of, and the former has been fully accomplished.

Die Alchemie in älterer und neuerer Zeit. Ein Beitrag zur Culturgeschichte, von Hermann Kopp. Heidelberg: Carl Winters' Universitäts-Buchhandlung, 1886. 8vo. 2 vol., pp 260 and 425. Price in paper covers, 16 marks. *Alchemy in olden and more recent times.* A contribution to the history of culture.

Perhaps no scientist living has done more for tracing the history of chemistry from the most ancient times to the present, than the author of the volumes now before us. His "History of Chemistry," published forty years ago, and his more recent historical works, entitled, "Contributions to the History of Chemistry," and "Development of Chemistry in Modern Times," testify to many years of patient study and faithful critical disquisition, through which he was enabled to present a clear record of facts embodying the evolution of chemistry from crude and incoherent observations and ideas to the exact science of the present day. Follies, deceptions and impositions in great number mark the gradual progress, and among them none had secured a firmer hold upon mankind than the faith in the art of the transmutation of metals, and more particularly of the making of gold. Many of the votaries of alchemy were firm believers in the ultimate success of this hidden art, which has its adherents even in the present time, and dates back to at least the fourth century of our present era. That in its vain search for gold it was productive of numerous discoveries which helped to build up a positive science, is well-known; but the present work does not deal with these results. It is devoted altogether to the history of this erro-

neous faith and obscure art in their numerous ramifications, and is therefore a most valuable contribution to the history of the gradual progress of culture, and likewise of literature since the voluminous writings of the alchemists and of the rosicrucians are concisely cited and explained.

Written in the full light of the present knowledge of chemical laws and proven facts, its language is nevertheless so free from technicalities, and its diction is so engaging and captivating, that it will be read with undiminished interest, not only by chemists, but by cultivated people generally. It sounds almost like fiction that in this enlightened age the art of gold making still lingers in some secluded localities, and that the faith in its success flickers occasionally in the brain of some honest student.

Aus der Molecular-Welt. Eine Gratulations-Schrift an Robert Bunsen, von Hermann Kopp. Dritte Ausgabe. Heidelberg: Carl Winter. Svo. pp 105. Price 2.80 marks.

From the world of molecules.

An excellent little work treating in a humorous manner of the modern views of atoms, molecules and chemical compounds. The author states in the preface that it was first written in 1876, but laid aside, until a few years ago, he concluded to revise it for publication in commemoration of the seventy-first anniversary of the birth of his friend Prof. Bunsen, who at that time was sojourning in Naples. The book must be read to appreciate its attractive humor and also its fine points of sarcasm.

Mémoire sur les Volumes Moléculaires des Liquids. Par Hermann Kopp. Heidelberg: C. Winter, 1886, Svo. Pp. 47.

Memoir on the molecular volumes of liquids.

This memoir was written in reply to one by Bartoli, which appeared in *Annales de Chimie et de Physique*, March, 1886, and which condemned in principle the results of a long series of researches, published by Professor Kopp more than thirty years ago in *Liebig's Annalen*. The rejoinder, in which the author undertakes to point out various errors of Mr. Bartoli, invalidating his conclusions, was intended for publication in the same journal in which the latter's paper appeared; but owing to a rule governing publications in the *Annales*, to avoid controversies likely to assume a personal character, it was suggested, but not concurred in by the author, to suppress certain sentences from Mr. Kopp's memoir, which he considered essential, or with the view of an early publication, to materially abridge it. The correspondence given in the preface, refers to this, as well as to some matters connected with the history of alchemy published by Mr. Berthelot. The subject matter of the memoir itself treats of questions the elucidation of which has formed a considerable portion of the author's prolonged scientific labors.

Dose and Price Labels of all the Drugs and Preparations of the U. S. Pharmacopœia of 1880, etc. For the use of Pharmacists, Physicians and Students. Second edition. By C. L. Lochman & Co., Bethlehem, Pa. Price, in paper cover, \$1.25; in flexible muslin, \$1.50.

Besides the pharmacopœial articles, a large number of extra-pharmaco-

pecial drugs, chemicals and pharmaceutical preparations are embodied in this work, which, as the title indicates, is intended to supply labels giving the dose and price of each article. But these labels contain also synonyms, the origin of the drug, the composition and strength of the preparation, medical properties, solubilities, etc.—information which in many cases will thus be found useful and convenient of access. The proof-reading has been done with great care.

In addition to the labels, which are intended to be attached to the receptacles in the store without replacing the usual shop labels, the book contains also tables of weights and measures, an explanation of thermometer scales, and lists of abbreviations in prescriptions, of incompatibles, of new remedies and of German names with their English equivalents. We consider the work, which has been very carefully prepared, as a very useful one for the purposes indicated above.

A Manual of Weights and Measures, including principles of metrology; the weights and measures now in use; weight and volume, and their reciprocal relations; weighing and measuring; balances (scales) and weights; measures of capacity; specific weight and specific volume, etc., with rules and tables. By Oscar Oldberg, Pharm. D., Professor of Pharmacy and Director of the Pharmaceutical Laboratory in the Illinois College of Pharmacy. Second edition, revised. Chicago: Chas. J. Johnson, 1887. 8vo pp., 246. Price, \$1.50.

On its first appearance, we have noticed this work at some length in our volume for 1885, page 639, to which we refer. The main portion of the present volume is identical with the former, but a few typographical errors have been corrected, and a chapter on coefficients of expansion has been added, with a number of valuable tables, showing, for numerous liquids, the rate of expansion by heat and the variation in specific gravity, apparent and corrected. There has also been added a table containing the weight of a bushel of a large number of articles as established by the laws of the different States: these weights vary in some cases for the same commodity in the proportion of 2:3, or 7:10, or even more. We conclude our present notice with what we said of the work two years ago, namely: That it deserves to be carefully read by physicians and pharmacists, even though the reader may not agree with all the views expressed by the author.

The reception of the following pamphlets is hereby duly acknowledged:

Thirtieth Annual Report of the Council of the Pharmaceutical Society of Australasia, with which is incorporated the Pharmaceutical Society of Victoria. With list of members and hon. members. Melbourne: 1887. Pp. 15.

Annual Address delivered before the American Academy of Medicine at Pittsburgh, Pa., October 12th, 1886, by R. S. Sutton, A. M., M. D., of Pittsburgh, Pa., President of the Academy. Pp. 13.

Twenty-sixth Annual Report of the Cincinnati Hospital for the fiscal year ending December 31st, 1886. H. M. Jones, Superintendent. Pp. 78.

Massachusetts State Agricultural Experiment Station at Amherst. Fourth annual report for 1886, pp. 130; and Bulletins No. 23 and 24 for March and April, 1887.

THE AMERICAN JOURNAL OF PHARMACY.

JULY, 1887.

ON JALAP RESIN AND JALAPIN.

BY JOHN M. MAISCH.

Read before the Pennsylvania Pharmaceutical Association, June 16.

Active principles or characteristic constituents isolated from plants are usually designated by names derived either from the generic or specific botanical name of the plant; in some cases it has been found more convenient to start from the popular name by which the plant or its useful part is known, either in its native country, or in the country in which the investigation has been made. The same rule holds also good for pharmacopœial and other medicinal drugs. If we apply this rule to the tuberous jalap root of Mexico, we have, in the first place, the officinal names *Jalapa* and *Radix jalapæ*, or *Tubera jalapæ*, by which it has been admitted into the different pharmacopœias, and, on the other hand, quite a number of botanical names have been given to the plant, which is *Convolvulus officinalis*, *Pelletan*, *Conv. Jalapa*, *Schiede*, (not *Lin.*), *Conv. Purga*, *Wenderoth*, *Ipomœa Purga*, *Hayne*, *Ip. Jalapa*, *Nuttall*, (not *Pursh*), *Ip. Schiedeana*, *Zuccarini*, *Exogonium Purga*, *Bentham*, and *Exog. Jalapa*, *Baillon*. The drug is known in Mexico as *purga*, also as *limoncillo* and *jalapa hembra*, or female jalap. The most characteristic name for the chief medicinal principle of this drug would evidently be *jalapin*, while *purgin* derived from the Mexican vernacular is obviously unsuitable. The former name has been used for the decolorized resin in older medical and pharmaceutical works, and is occasionally still met with for the so-called resinoid, which is simply the resin, more or less purified by washing with water, by repeated precipitation from alcohol, or by treatment of its alcoholic solution with animal charcoal. In chemistry, however, jalapin is a totally different, though an analogous compound.

Hume applied the name *jalapine* to a supposed alkaloid (*Med. and Phys. Jour.*, April 1824, p. 346). I was unable to consult the original paper; but in Buchner's *Repertorium* xxxvii, 204, it is stated that this principle was prepared by exhausting the root with concentrated acetic acid and precipitating the liquid with ammonia; the white substance was totally insoluble in ether, but dissolved readily in alcohol. Meylink, (*B. Rep.* xxxii, 446), could not obtain it in crystals. Subsequently Schweinsberg (*Magaz. f. Phar.*) thought the precipitate consisted of ammonio-magnesium phosphate with a little calcium phosphate; but Dulk, (*Berl. Jahrb.* 1825, xxvii,) showed it to be resin combined, as he supposed, with acetic acid; more properly speaking it is contaminated with acetic acid, some of which is persistently retained.

A communication from Van Mons, in 1826, who had endeavored to decolorize resin of jalap by treating its alcoholic solution with gaseous chlorine, gave J. Pelletier, (*Jour. de Phar.*, 1826, xii, 143,) an opportunity to refer to his long continued researches, undertaken for the purpose of isolating from jalap root a purgative principle distinct from the resin; these researches were unsuccessful, and the investigation of this important subject was stated by Pelletier to be connected with great difficulties.

About the same time T. W. C. Martius ascertained (*Kastner's Archiv*, 1826, vi, 286), and soon afterwards L. A. Planche confirmed the observation (*Jour. de Phar.* 1827, xiii, 167), that jalap resin may be completely decolorized by treatment with animal charcoal, without depreciating its purgative properties; the latter obtained similar results also with two other hydragogue cathartic convolvulaceous resins, those of scammony, and of the herb of *Convolvulus Soldanella*, *Lin.* A modification of the process for decolorizing jalap resin, was published by Martius in 1835, (*Buch. Rep.* li, 367).

In 1831, A. Buchner and J. E. Herberger announced (*Buch. Rep.* xxxvii., 203-212) the isolation of the supposed alkaloid jalapine by dissolving the brownish-yellow resin of jalap in alcohol, and precipitating an acid with lead acetate, after which water would precipitate subacetate of jalapine; by treatment with a little sulphuric acid, and subsequently with lead hydrate, the supposed alkaloid was obtained as a colorless transparent mass, pulverizable, totally insoluble in ether, soluble in alcohol, also in concentrated acetic acid, and less freely in strong mineral acids, usually with decomposition. The lead compound precipi-

tated from the resin on being treated with H_2S , yielded a brown mass, which was readily soluble in alkalies, also in ether and in acids. This acid and the jalapine were regarded as uniting to a subsalt, and thus constituting the natural resin.

While examining scammony, Clamor Marquart noticed in 1836, (*Archiv d. Phar.* lvii, 236,) that in certain solutions precipitates were obtained with tannin; likewise in certain solutions of jalap resin, and the presence of alkaloids was inferred in both products.

The elementary analysis of jalap resin made by Johnston in 1839 (*Philos. Trans.* ii, 342) proved the presence of C, H and O, and the absence of nitrogen. A similar result had already been obtained by O. F. Goebel in 1821 (*Buch. Rep.* xi, 84.)

Cadet de Gassicourt first observed (*Jour. de Phar.*, 1817, iii) that jalap resin may be separated by means of ether into two portions; one hard and resin-like, insoluble in ether, soluble in warm alkalies and from these solutions not precipitated, or merely very slightly so, on the addition of a mineral acid; the other portion soft, plaster-like, soluble in ether, and likewise in warm alkalies, but from the latter solution precipitated by acids in the same manner as the crude resin. It is the portion insoluble in ether which was subsequently called jalapine by Hume, Buchner and Herberger, though by them erroneously supposed to be an alkaloid.

The insolubility of the hard and soft portion of jalap resin in oil of turpentine appears to have been first noticed by Trommsdorff (*Neues Jour. d. Phar.*, 1833, xxv) and was by him and others recommended as a convenient test for proving the absence of agaric resin, colophony and others, with which jalap resin was sometimes adulterated. Bley afterwards found (1839, *Buch. Rep.* LXV, 374) that ordinary oil of turpentine would dissolve a little jalap resin, but the freshly rectified oil take up merely a trace of the latter.

During his investigations of the resins of jalap and orizaba root, (1844, *Annalen* li, 81) G. A. Kayser observed their solubility in strong sulphuric acid with the production of a red color, and regarding this reaction as characteristic introduced the names *rhodeoretin* and *pararhodeoretin*, the former for the hard, white, in ether insoluble resin of tuberous jalap, the latter for the similar, but in ether soluble, resin of fusiform jalap. Kayser proved also that the resins, which have a neutral reaction on litmus, on being dissolved in warm alkalies, are converted into acids soluble in water. The ether-soluble resin of tuberous jalap

has, however, an acid reaction and retains the peculiar odor and acrid taste of jalap. B. Sandrock (1850, *Arch. d. Phar.* cxiv, 160) obtained it of a yellow color, soft, tough, not becoming hard and brittle on drying, precipitated by lead acetate, soluble in alkalies and after prolonged boiling of this solution converted into a peculiar acid somewhat soluble in water. He named this soft resin "gamma-resin," and regarded the ether-insoluble resin as consisting of "alpha-" and "beta-resin," which, however, were soon shown to be not materially distinct. Pereira (*Mat. Med.*, Amer. edit. 1854, p. 520) retained for this resin the name jalapin, and called jalapic acid the portion soluble in ether.

F. Holl (1846, *Arch. d. Phar.*, xeviii, 45.) and others had shown that the color reaction observed by Kayser with sulphuric acid is by no means characteristic for the jalap resins, but in his first researches Wm. Mayer retained (1852, *Annalen*, lxxxii, 121) the name rhodeoretin, until after having extended them to the resin of fusiform jalap (1856, *Annalen*, xev, 129), he very unfortunately adopted for the pure resin of the latter the name *jalapin*, while the ether-insoluble resin of tuberous jalap which is the most important active principle of this drug, was designated *convolvulin*. The ether-soluble resin accompanying the latter was not investigated by Mayer. The pure resin of scammony, at first called *scammonin*, was through the researches of F. Keller and H. Spirgatis (1857-1860, *Annalen*, civ, 63; cix 209; cxvi, 289; *Buch. N. Rep.*, vii, 9, 511) shown to be identical with the jalapin of the orizaba root.

It is very difficult, if not impossible, to ascertain now by whom the name jalapin was first applied to the soft resin of true jalap, with which Mayer's jalapin has nothing in common except the solubility in ether; but it is thus designated in several English, French and German works. The confusion is thereby increased, for the name jalapin which was originally given to the ether-insoluble resin of true jalap root, is now occasionally applied to the more or less decolorized natural resin of jalap, the greater portion of which is insoluble in ether; 2., to the ether-soluble portion of this resin, soft at ordinary temperature, readily fusible and not becoming brittle even after prolonged exposure to a heat of 100° C.; and 3., to the pure white resin of Orizaba jalap and of scammony, brittle at ordinary temperature, and melting at about 150° C.

In answer to the question as to what is sold commercially as jalapin, attention may be drawn to a paper recently published in *Phar. Jour. and Trans.*, Feb. 12, 1887, pp. 650-652 in which eight samples were

examined, one of which was completely soluble in ether, and consisted either of Mayer's jalapin or of tampicin, the resin of Tampico jalap which however has a lower fusing point than the former, namely about 130° C. The other samples, seven in number, were evidently resins of true jalap and yielded between 3.5 and 7.3 per cent of ether-soluble resin, which, though stiff and tenacious, and incapable of being rendered quite hard, was considered to be identical with jalapin; its solubility in warm ammonia was not ascertained.

"Jalapin" does not appear to be often prescribed in the United States; still it was not difficult to procure under this name two entirely distinct articles, one of which, being of German manufacture, answered to the characters of Mayer's jalapin in being soluble in ether, while the other yielded to ether 3.3 per cent. of a soft brown resin, which had an acid reaction and was soluble in warm potassa solution and reprecipitated by excess of acid; warmed with ammonia a milky emulsion-like mixture was obtained, but not a clear solution. This soft resin was dissolved in absolute alcohol, for several days treated with animal charcoal, and the filtrate evaporated, when a soft brownish yellow mass was left, neutral in reaction, leaving no residue when ignited, and giving with warm ammonia a milky mixture. A second and third treatment with somewhat weaker alcohol, and excess of animal charcoal, diminished the quantity of this soft mass very considerably, but without materially altering its characters. After a fourth treatment, only a minute quantity of it was left, the properties being unaltered. It follows from these results that this ether-soluble portion is entirely distinct from Mayer's jalapin; in fact, its resinous nature appears to be quite doubtful, and it seems to me more nearly related to the fats and waxes, and to be absorbed from its solution by a large quantity of animal charcoal.

In 1854 Prof. L. A. Buchner (*N. Rep.*, iii, 22; *Amer. Jour. Phar.*, 1854, p. 446) reported that the ether-soluble portion of jalap resin behaves like rhodeoretin (or convolvulin) with alkalis; for if resin of jalap be dissolved in warm potassa solution, and the liquid supersaturated with an acid, either no change takes place or only an opalescence without real precipitation, according to whether the resin had been decolorized by animal charcoal or not.

A somewhat analogous observation has more recently been published by Prof. Flückiger (*Phar. Zeitung*, 1883, p. 211), according to which resin of jalap decolorized by animal charcoal is dissolved by

warm ammonia water and not reprecipitated by acids. The explanation of this behavior, it appears to me, is to be found in the removal, by the charcoal, not only of coloring matter, but also of that substance in jalap resin which is soluble in ether.

The second sample of jalapin, to which I referred above, did not essentially differ from the pharmacopœial resin of jalap, except that it was lighter in color, and was sold at about three times the price of the latter.

Now, considering the confusion in regard to the term "jalapin," it appears to be extremely desirable to abandon it altogether, in pharmacy and in chemistry, and to likewise abandon the term "convolvulin" as not sufficiently characteristic. The ether-insoluble resin of true jalap may be very appropriately called *jalapurgin*, which indicates the origin of the principle as well as its medical properties; the ether-soluble portion, however, is (at least in its crude state) a mixture, and does not deserve a distinctive name until fully investigated. On the other hand, the ether-soluble resin of fusiform jalap, to denote its origin, should be called *orizabin*, which, on account of its identity with the resin of scammony, would be synonymous with *scammonin*.

It may be stated yet that my present experiments agree very well with those made in previous years, when I ascertained that the ether-soluble resin of jalap, after being treated with animal charcoal, is not white, but brownish-yellow; is not brittle, but sticky, and dissolves in warm potassa to a slightly opalescent solution, which becomes milky on the addition of an acid. Still it is possible that the results may vary to a certain extent, since the amount of ether-soluble matter has been found to vary from between 3 and 4 per cent. to about 12 per cent. of the total pharmacopœial resin.

Whether the introduction into medicine or into the pharmacopœia of a pure "jalapurgin" is desirable, appears to be doubtful; for according to the investigations of Dr. W. Bernatzik, (*Zeitschr. d. k. k. Gesellschaft. d. Aerzte in Wien*, 1862, 1863; *Buch. N. Rep.* 1864, xii, 451-467,) about equal purgative effects are obtained with 0.17 gm. of pharmacopœial resin of jalap, 0.216 gm. pure convolvulin, and 0.50 gm. of soft jalap resin (the ether-soluble part).

Two samples of jalap resin recently examined by me yielded respectively, 3.01 and 4.8 per cent. to ether; in neither case was the exhaustion complete, but very nearly so. A good plan for treating jalap resin with ether is that followed by E. White (*loc. cit.*), mixing with

about three times its bulk of sand, and percolating with ether; the operation is tedious, the last portions of the substance being with difficulty removed. Another method is solution of the resin in a small quantity of warm alcohol and precipitation by ether gradually added; a considerable quantity of the latter is required for precipitating the last portions of the ether-insoluble resin, and it will be found advantageous to evaporate the ether solution, re-dissolve the residue in little alcohol, precipitating again by ether, and to repeat this operation several times.

Should a lighter colored resin of jalap than the present one be desirable, and there are good reasons for the admission of such a product—the process originally suggested by L. A. Planche (*Bull. de Phar.* 1814, vi, 26), and variously modified by later writers would probably be preferable to the pharmacopœial process. Without entering into details, the following references to observations on this subject may be of interest: Ilisch (*N. J.* iii 2; *Buch. Rep.* 1824, xviii, 210), Thiele (*B. Rep.* 1826, xxiii, 306), Gummi (*ibid.*, 1827, xxvi, 106), Wolf (*ibid.*, 1828, xxix, 372), Torosiewitz (*ibid.*, p. 384), Raab (*ibid.*, 1832, xlii, 143), Buchner (*ibid.*, 1834, xlix, 252), Martius (*ibid.* 1835, li, 363, 367), Geiseler (*Arch. Phar.* 1836 lxiii, 221), Mouchon (*Jour. Chim. méd.* 1837, p. 382), Nativelle (*Jour. Phar. Chim.* 1842 [3] i. 228) and others. It may be briefly stated that in these processes the jalap-root, either unbroken, or in small pieces, or in powder, is first exhausted by water, either cold or hot; the drug is then drained and while still wet or after having been previously dried, exhausted with either cold or warm alcohol; the tincture is concentrated and the residue washed with water. In some cases the material exhausted by water is directed to be mixed with animal charcoal and then treated with alcohol. Emile Mouchon avoided the treatment of the root with water, but mixed the powder with $1\frac{1}{2}$ times its weight of animal charcoal, displaced this mixture with alcohol, and precipitated the concentrated tincture with water.

It will be observed that numerous processes may be devised for obtaining jalap resin white, or nearly white, or at least much lighter in color than the present pharmacopœial *resina jalapæ*.

Aniline is recommended by Dr. Kremjansky, of Charkow, for destroying the bacilli of phthisis; he proposes the use of atomized aniline, in connection with inhalations of fresh air and of oils of turpentine, anise and eucalyptus.—*Br. Med. Jour.*

ON THE USE OF WEIGHTS AND MEASURES IN LIQUID PREPARATIONS.

BY PROF. JOS. P. REMINGTON.

Read before the Pennsylvania Pharmaceutical Association, June 16.

What advantages would be gained by extending the system now official for fluid extracts, to all the liquid preparations of the Pharmacopœia? That is, to substitute the gramme and cubic-centimetre for parts by weight.

To the majority of pharmacists who have received their pharmaceutical education in America the principle of expressing quantities in official formulæ in parts by weight was comparatively unknown until 1882, when the United States Pharmacopœia (1880) was first issued; it is true that the Pharmacopœial Convention of 1870 directed its Committee of Revision to express their formulæ in weights and parts by weight, but the 1870 committee, by a unanimous vote, took the bold step of disregarding the directions of the convention, and the U. S. Pharmacopœia of 1870 appeared with the quantities expressed, mainly in troy and fluidounces. For this action, the committee suffered condemnation at the hands of those who favored the method used in Continental Europe, and when in 1880 the Pharmacopœial Convention reaffirmed the judgment of the Convention of 1870, and ordered its committee to use parts by weight in expressing all formulæ, it was felt that the command could not be disregarded, although the individual opinion of the members was not united on the subject.

The Committee of the American Pharmaceutical Association on the United States Pharmacopœia, who presented a valuable report in 1878, carefully outlined the leading principles which should guide the final Committee of Revision, and "parts by weight" constituted the "chief innovation." Yet this report was unanimously adopted by the American Pharmaceutical Association, and eventually became the skeleton of the Pharmacopœia of 1880, for all of its leading principles were adopted by the Pharmacopœial Convention of 1880. It will thus be seen that "parts by weight" came legitimately and naturally into our last Pharmacopœia, and whatever doubts were held by some of the members of the committee as to the merits of the system, it cannot be said that full time and consideration were not given to the subject, and time alone could be trusted to prove whether upon fair trial it would survive or fall.

It would be beyond the scope of this paper to enter into all of the arguments *pro and con* upon this very important subject; for much

more time and labor have been spent in discussing "parts by weight" since the issue of the Pharmacopœia than before. Yet it needs very little time to prove that after five years' trial before the country the "consensus of pharmaceutical opinion" is greatly in favor of *weighing solids and measuring liquids*.

That there are advantages in the system adopted in the Pharmacopœia, no one can gainsay; the operator can choose from the formula whatever denomination he desires and by substitution for parts he can use grammes, drachms, grains, scruples, pounds, kilogrammes, or any other weights. The adoption of the centesimal ratio of expressing the proportions of the ingredients, whilst not necessary to the success of the principle of using parts by weight, was rendered desirable in view of the anticipated use of the metric system, and so the method adopted in the Pharmacopœia undoubtedly favored the use of the gramme and its multiples, because the multiplication and division were effected by decimals. There are many operations in the laboratory, which are more conveniently performed by weighing the liquids; for instance in making a barrel of soap liniment, it is very convenient, and usually more accurate to roll the barrel on the platform scales, tare it, and to pour the liquids in successively until the proper weight is indicated, and after adding the solids and inserting the bung, the barrel may be rolled backward and forward until solution is effected. Then again in the case of adhesive, corrosive or acid liquids, it is far more convenient to weigh them than to use measures. But it must be remembered that the vast majority of those who employ the pharmacopœia use fluid-ounces and not gallons or barrels as their units, whilst the few adhesive, corrosive, or acid liquids that must be mixed together, constitute a small class which may properly form exceptions to the rule.

Where small quantities of liquids are concerned, it cannot be denied that graduated measures still continue to be used to as large an extent as ever, and so long as physicians continue to prescribe liquids by measure and administer them in teaspoons and tablespoons, just so long will graduated measures be employed, and it would be illogical and useless to expect prescriptions to be compounded by weight unless convincing arguments can be presented to prove the greater convenience and accuracy of weighing liquids. Now, so far as convenience and practicability are concerned, it must be admitted that the glass graduated measure maintains its supremacy; and as to accuracy, it has been well contended that there is just as much liability to

error in weighing liquids as in measuring them; in fact, the question of accuracy on either side resolves itself into a personal equation, and a careless operator will be just as likely to be loose and slovenly in using his weights as he would in filling his graduate. But it has been urged that liquids change their volume according to their temperature—heat expanding them and cold contracting them—and hence an ounce of liquid measured in the winter time will be greater than one measured in the summer time. This is a physical fact that cannot be gainsayed, yet it must be admitted that the amount of variation is trifling and, when we regard the present methods of administering medicines, unworthy of consideration.

The plea of greater accuracy in making liquid pharmaceutical preparations when they are weighed, receives a severe practical check when we reflect that a large proportion of the analytical chemists of to-day rightly use volumetric estimation in their every-day work. Now, if these conspicuous apostles of accuracy, who have done so much to aid the sciences of chemistry and pharmacy, cheerfully disregard the variations due to change in volume by expansion and contraction in their standard solutions, and yet be able to make trustworthy analyses, so that they are willing to depend upon the number of cubic centimetres of test solution which drop from their burettes to their beakers, how utterly insignificant does this variation appear when applied to the work of the pharmacist, for he makes tinctures, fluid extracts and syrups which are to drop or pour from bottles or teaspoons into stomachs containing more or less digested dinners.

Then again if the plea of greater accuracy in favor of weighing pharmaceutical liquids is to be effective, a number of far more important questions must be considered and met. The galenical preparations of to-day vary in strength for several reasons, drugs contain different amounts of moisture and no hygroscopic standard has ever been determined upon; this variation can easily amount to ten per cent. The quality of the drug used in these preparations except in one or two cases is at present determined by the conscience and character of the operator, no officinal standard having been adopted, and it is doubtful if reliable methods of fixing standards for all galenical preparations can ever be developed. In view of these facts does it not appear that the system of measuring liquids, particularly if standard measures are carefully used, is far more convenient, practical, and useful for the retail pharmacist than that of weighing?

The advantages that would be gained by substituting the use of the gramme and cubic-centimetre for "parts by weight" are those which belong then to the use of "solids by weight and liquids by measure," and although this change would be in the writer's opinion a great improvement, there seems to be so much opposition to the use of the metric system in this country that it is very doubtful at this time whether the gramme and cubic centimetre could be adopted with a reasonable chance of its universal use without legislative aid; and even then its success would be problematical. The metric system is undoubtedly the most simple, comprehensive and beautiful system that has ever been devised, and if its one great defect of binary divisions and subdivisions could be overcome, its inherent advantages would be so apparent that pharmacists everywhere would be glad to adopt it for its intrinsic worth; but even with this defect it is, in the writer's opinion, greatly to be preferred (if the measures are used) for pharmaceutical practice than parts by weight.

CARMINE SOLUTION.

BY JOSEPH W. ENGLAND, PH. G.

Read before the Pennsylvania Pharmaceutical Association, June 16.

As a rich, deep red coloring agent for various elixirs, syrups and mixtures, cochineal, or its more concentrated representative—carmine, probably stands unequalled by any other, in popular favor and usage, but there are several features in connection with its use, that seriously interfere with and restrict its more general employment, and these are, that the various solutions, as generally made, are either too weak in the quantity of their dissolved carmine, or unstable or, if made strong, they contain such an excess of ammonia water or potassium carbonate, that their addition, as colorants, to alkaloidal solutions is contraindicated through their well known precipitating influence upon alkaloids. Again, more especially in concentrated solutions where water of ammonia is used as a solvent, the gradual evaporation of the dissolved ammonia gas, on exposure to air, is accompanied by deep turbidity of the transparent solution, gradual deposition of precipitated carmine, followed, on standing, by decomposition. Lastly, as a further objection, solutions of carmine in alkalis, do not give the true shade of carmine, but a violet or purplish red, essentially distinct from that characteristic red color.

The true chemical constitution of carmine, in the present state of knowledge, is shrouded in considerable doubt, although it has been made the subject of repeated analyses ever since Pelletier and Caven-ton first examined it in 1818. One of the latest and most satisfactory researches has been made by Messrs. Will and Leymann¹, who dissolved pure carmine red in 50 per cent. acetic acid and boiled it with an excess of bromine, whereby colorless needles of $C_{10}H_4Br_4O_3$ were obtained. The acetic acid mother-liquor, on dilution with water, yielded yellow amorphous floccules which, boiled with KHO, gave a red pulverulent salt, the crystalline acid of which, when liberated, gave the formula $C_{11}H_5Br_3O_4$. It exhibited no tinctorial properties, but all its salts were strongly colored. Further, on treating the alkali solution with stannous chloride and supersaturating with HCl, ether extracted a substance, the solution of which, on exposure to air, acquired a color similar to that of a cochineal solution and, like the latter, became violet red on the addition of an alkali. The products obtained by these investigations may be summed up as having the formula $C_{10}H_8O_3$, a colorless acid, capable of forming colored salts, as $C_{11}H_8O_4$, and a readily oxidizable chromogene whose constitution is unknown.

Let us, for a moment, following Dechan, briefly review the results of earlier investigators and see how widely they differ from each other. De la Rue² first gave as the formula of carminic acid $C_{14}H_{14}O_8$. This was denied by Schutzenberger, who claimed that De la Rue had been experimenting with a mixture of several substances, and that the true formula of this acid was $C_9H_8O_5$. Again, Schaller obtained results which differed from these by H_2O , and expressed the opinion, that the acid was dibasic and capable, therefore, of forming both acid and normal salts. Hlasiwetz and Grabowsky³ came to the conclusion that the carminic acid of previous investigators was a glucoside for, on treating it with boiling dilute sulphuric acid, it was found to yield a peculiar kind of sugar and a substance they called carmine red. Their formula was $C_{11}H_{12}O_7$. Dechan⁴ instituted experiments for the purpose of determining whether carmine could be prepared without the use of alum or tin spirits and very clearly established the fact, that either of the bases, aluminium or tin, were essential for its production. Hence,

¹ Ber. D. Chem. Ges., 1885 p. 3180-3193; AM. JOUR. PHAR., 1886, p. 91.

² Gmelin, xiii p. 358.

³ Jour. de Pharm., Sept., 1866; A. J. P. 1866, p. 504.

⁴ Pharm. Jour. and Trans., Dec. 12, 1885; A. J. P., 1886, p. 30.

it may be inferred that commercial carmine is mainly a tin or aluminium salt of an acid glucoside. Further, Dechan found that all aluminium or tin compounds of cochineal, are readily soluble in dilute ammonia, whereas the substances, with which it is liable to be adulterated, as, for example, vermilion, chrome red, starch, uncombined alumina, etc., are, as a rule, not soluble in that menstruum. Liebermann¹ found that pure cochineal carmine is not entirely soluble in alcohol and water; water dissolves it sparingly, alcohol considerably. Instead of containing only traces of alumina and lime, as is usually supposed, he found as high as 8 per cent.

Some months ago, I commenced a series of experiments upon carmine and its solvents, in order to obtain, if possible, some practicable process not open to the objections previously mentioned, whereby a more stable, concentrated and thoroughly representative product could be secured. Suffice it to say, that the result has been obtained and I present, for your inspection, a sample of the solution made over two weeks ago. The following is the formula:

Carmine (No. 40.).....	3 iv.
Water of ammonia.....	f 3 iii.
Glycerin,.....	f 3 iii.
Water, q. s.....	ad f 3 viii.

Rub the carmine into a fine powder, in a wedgwood mortar, make a paste with and dissolve in the water of ammonia and then add, with constant trituration, the glycerin. Transfer to a porcelain capsule, and heat upon a water-bath, until the liquid is entirely destitute of ammoniacal odor, cool and add the water. The entire removal of the ammonia gas, requires the constant stirring of the liquid, with a glass rod, and rather lengthy heating.

The finished product is a permanent deep, ruby-red liquid, perfectly transparent, destitute of ammoniacal odor and mixes, without turbidity, with all aqueous solutions. It should develop no precipitate with mercuric chloride, indicating the absence of free ammonia; and on the addition of AmHO should acquire a purplish tinge. It gives the true carmine color to solutions without exhibiting the purplish tinge so characteristic of alkaline solutions. 30 to 60 drops to a pint of liquid are sufficient to color, but the depth of color may be varied to suit individual tastes.

¹ Rundschau, No. 52, p. 835; A. J. P. 1886, p. 102.

PHARMACEUTICAL NOTES.

(Abstracts from Theses.)

Fluid extract of scutellaria, as seen in the shops usually has a certain amount of precipitate. Edward Pennock, Ph. G., states that the formation of this precipitate may be prevented or considerably lessened by using a menstruum containing 5 per cent. of glycerin; the percentage of alcohol is not stated.

Distilled water of witchhazel.—John Keifer, Ph. G., obtained from a large distiller in Connecticut particulars as to the manufacture of the distillate, of which the following is an outline: The twigs of hamamelis are collected with the buds in the fall and early winter, are cut into pieces from 6 to 12 inches in length, and then distilled from copper stills in the presence of water, and usually by means of steam. The first portion of the distillate is milky, subsequently it is clear. About a ton of twigs is used to produce one barrel of distillate to which is added from 5 to 7 gallons of alcohol as a preservative, a pound of the finished product representing from 6 to 8 pounds of twigs. This so-called distilled extract is clear, colorless, entirely volatile and has a somewhat pungent aromatic odor.

Myrrh-gum has been experimented with by H. E. Emerson, Ph. G. The residue of myrrh left after the preparation of the tincture, was washed with alcohol, and dried, and subsequently dissolved in one, two and four parts of water. After straining the yellowish opaque mucilage its adhesive properties were tried and found to be rather superior to gum arabic, since it causes labels to adhere tightly to glass, wood, tin, etc. Though its want of transparency detracts somewhat from its usefulness, it has the advantage of keeping unaltered for a long time.

The results corroborate those of E. B. Shuttleworth (AM. JOUR. PHAR., 1871 p. 369) and C. E. Escott (ibid., 1887 p. 69). Mr. Shuttleworth suggested the addition of a little molasses to the mucilage to increase its adhesive properties.

Chloral and Camphor.—A. G. Georges, Ph. G., made some investigations on the behavior of chloral hydrate and powdered camphor; it is not stated whether the latter was absolutely free from alcohol or other liquid possibly used in powdering. Triturating together one part of the camphor and two parts of chloral hydrate, a colorless syrupy liquid of 1.280 specific gravity was obtained. Using equal parts of the two substances, the density of the liquid was 1.210, and it dissolved

one-third part of camphor. The mixture of 7 parts of camphor and 3 parts of chloral is opaque, pulverizable, has the density of 1.10, and in contact with water is gradually decomposed, camphor rising to the surface and chloral hydrate entering in solution. The mixture of two parts of camphor and one part of chloral forms a partial solution, some camphor remaining undissolved, and the liquid portion will dissolve two more parts of chloral, before it is saturated with the latter. A solution of one part of chloral in (from one to) four parts of water will gradually dissolve four parts of camphor and deposit an oily liquid, which will neither mix with, nor be decomposed by, the water in which it was formed, even on heating it to the boiling point; but on the addition of more water, camphor will separate, and chloral be dissolved. (See also AMER. JOUR. PHAR. 1886 p. 282.)

Rhus glabra.—A good ink may be prepared from sumach leaves, according to Oscar J. Lache, Ph.G. A decoction is prepared by boiling 1 oz. of the bruised leaves for half an hour in one pint of water, and straining; 90 grains of sulphate of iron, and 60 grains of gum arabic are added. The ink has at first a brownish cast which disappears in a few days; after about two weeks it can scarcely be distinguished from ink made from nutgalls.

On evaporating an infusion of the berries hard crystals of calcium acid malate are obtained, having a red brown color; by repeated recrystallization they may be obtained clear and transparent. They are decidedly acid, and are with difficulty dissolved in cold water. The acid was prepared by Procter's process (see U. S. Disp.) On precipitating the solution of the calcium salt with acetate of lead, and decomposing the precipitate with sulphuretted hydrogen, a filtrate is obtained, which on evaporation, yields prismatic crystals of *malic acid*. The yield is from 3 to 4 per cent.

AMMONIUM IODIDE.

By R. ROTHER.

Judging merely from the simplicity of its chemical nature ammonium iodide does not appear to be the really difficult compound to prepare that it is. It does not come strictly within the province of dispensing pharmacy to operate in the direction of such products, but if time and opportunity permit it is occasionally interesting and instructive, if not economical, to indulge in such practices. Mere infer-

ence from analogy unsustained by practical experience would lead to the expectation that free ammonia reacting on free iodine generates iodide and iodate of ammonium. But in practice nothing of the kind is realized. The black insoluble compound therefrom resulting is generally a mixture of the 3 or 4 chemically possible and dangerously explosive iod-ammonias. A variety of more or less practical and efficient methods for preparing iodide of ammonium are extant. One of the chief difficulties encountered, however, in seemingly all the processes, is the occurrence of free iodine in the finished product. Some very elegant ammonium iodide is found in the market, but much of it also is not as white as it should be, whilst some of it soon becomes not only yellow but positively brown from the accumulation of free iodine. It is presumed that exposure to light primarily induces this deteriorating effect. The real root of the difficulty, however, is due to the access and joint influence of free oxygen and moisture. When the dry discolored iodide is submitted to a moderate heat in an open vessel much of the seemingly free iodine is dissipated. But a very small proportion is persistently retained at all practically low temperatures. The pharmacopœia states that ammonium iodide when heated on platinum foil evolves free iodine, and is wholly volatilized without fusing. This is all correct enough, but such a statement is misleading, in so far that it induces the belief that ammonium iodide is readily decomposable by heat. When, however, the pure salt is heated in a dry test-tube a faint grayish film first deposits on the walls of the glass. Under an increased temperature the salt then sublimes unchanged in white crystals. But as a portion of the saline vapor in the upper end of the tube necessarily mingles with the air it is decomposed by the oxygen of the latter yielding free iodine, free ammonia and water. The free iodine first appears as a violet vapor, but being absorbed by the saline humidity forms a brown deposit which soon becomes black as the iodine crystallizes. During the heating process the residuary iodide at the bottom of the tube remains white and crystalline until all has sublimed and deposited farther up in the tube as equally white crystals.

The Pharmacopœia also states that the discolored salt may again be whitened by washing it with stronger ether and rapidly drying. The writer could not obtain the requisite whiteness by this method. Furthermore the escaping ether seems to invite both oxygen and water to degenerate the salt anew.

It was ascertained that acetic ether is perfectly satisfactory as a decolorizer, but it also dissolves a very considerable proportion of the salt. On treating the red acetic ether solution with a little water, two strata are formed. The upper one retains most of the free iodine and but little of the salt, whilst the lower one, being chiefly aqueous, contains most of the iodide and some free iodine.

Alcohol does not wholly decolorize the salt whilst it also dissolves too large a proportion of it. Chloroform, benzene and benzin were found inapplicable for other reasons beside lack of solvent power over the adherent iodine.

At this juncture it seems appropriate to say something about the prevalent nomenclature attaching to the two substances last named.

It is not commonly understood that benzin, also termed, benzine, naphtha, gasoline, petroleum spirit, &c., is wholly different from benzene, also called benzol, and benzole. The former body, which might conventionally be termed, benzane, is a mixture of hydro-carbons, belonging exclusively to the paraffin series, a portion of the so-called fatty group. The latter body, benzene, is the characteristic member of the so-called aromatic group of hydro-carbons. Still another confusion prevails in the indiscriminate application of classic, ordinal and generic terms. For instance the fatty group as a whole is classed as methane derivatives, although methane is but a paraffin and although the class of fatty hydro-carbons is composed of the orders of paraffins, olefines, acetylenes, terpenes, &c.

Then in addition the fatty group is designated as paraffinoids and in analogy the aromatic group is styled the benzenoids, a nomenclature, which is as incorrect and unsatisfactory as the former. Chemical and physical inferences have led to the structural symbolization of the fatty hydro-carbons and derivatives, as so-called open chains. That is the graphic representation of the main axis is flat, hence they might appropriately be termed the organic homaloids. For pertinent reasons the members of the aromatic group are represented as closed chains. Hence, since their main axes are recurved upon the origin, they might with equal propriety be styled the organic sphericoids. But independently of this nomenclature, the paraffins, olefines, acetylenes, terpenes, benzenes, &c., might conveniently and correctly be known as the methanids, ethenids, ethinids, terpenids, benzenids, &c., respectively. Hence for instance a terpenid may be a sphericoid and yet have no structural relation to the benzenids.

On slowly evaporating an aqueous solution of ammonium iodide in contact with the air iodine is liberated, whilst the liquor turns yellow and gradually brown. Meanwhile rather large glassy crystals of the salt are formed. After evaporation to dryness and extinguishment of the free iodine by some suitable method, the finished product is not desirably white owing to the preponderance of transparent crystals. When, however, the solution is rapidly boiled down until most of the salt has crystallized and the remaining water is finally expelled by water-bath heat, a minutely granular and white salt results. But no process of condensation in presence of the atmosphere will yield a product untainted by free iodine. So remarkably small a proportion as one per cent. of water will dampen the salt; but a water-bath temperature readily dispels it, so that a perfectly dry granular powder destitute of adhesive capacity is obtained. As already stated, a much discolored salt can be rid of most of the contaminating free iodine by means of careful heating. But as total decolorization is thus impossible other aids become necessary. When solution of sulphurous oxide is dropped upon practically white ammonium iodide the mixture becomes yellow from liberated iodine. But if a reddened salt is treated with the acid first neutralized with ammonia the free iodine is extinguished by the ammonium sulphite. This last reaction, therefore, offers a remedy for the restoration of the normal appearance or a barrier against its escape. The lesser evil of contamination by traces of sulphate and sulphite seems warranted against the greater by vitiation through free iodine. Hence, instead of attempting the reclamation by washing with ether, which does not reclaim, it is better to treat the discolored salt with a mixture of sulphurous acid and ammonia and dry it on a water-bath.

The usual method for preparing iodide of ammonium consists in precipitating a solution of either ferrous or ferric iodide with ammonia and evaporating the filtrate to dryness. By this process it is not always possible to obtain a salt wholly free from iron, especially when cast iron filings were used in the preliminary preparation of the iron salt. However, when pure calcium iodide, prepared by whatever method, is decomposed with excess of ammonium bicarbonate aided by heat, several advantages are secured thereby.

Prominently among these is the crystalline and compact form in which the calcium carbonate precipitates. From this results the further possibility of procuring the generated ammonium iodide in a

more concentrated solution than usual, whilst the washing out of the salt is effected with relatively little water. These conditions, hence, necessitate the expulsion of comparatively less water, and consequently occasion the exposure of the salt during a more limited period. In connection with this also goes the important advantage derived from the ready manner of producing the required calcium iodide. Elsewhere (AMER. JOUR. PHARM., May, 1883) the writer gave a process for this purpose. This permits the generation of the ferric iodide, calcium iodide, and finally ammonium iodide, in an uninterrupted course requiring no large variety of utensils and but a single filtration. Ultimately the ammonium salt is absolutely free from iron and calcium. A fine annealed iron wire should be used in abundant excess in the preliminary production of ferrous iodide. This form of iron contains some carbon and traces of other substances which either remain or become insoluble during the operation. An only seemingly considerable grayish flocculent residue separates; this, however, is but the superficial magnetic oxide of iron with which the wire becomes covered during its manufacture. In order to avoid any possible excess of iodine in the generation of the ferric iodide, more than two-thirds of the iodine is employed in the formation of the ferrous salt. In this case the precipitated ferric hydrocarbonate is as compact and granular as usual. These various considerations have led to the construction of the following formula:

Iron wire, very fine and in long spiral loops.....	1 troy ounce.
Iodine.....	3 " ounces.
Calcium carbonate precipitated.....	1½ " "
Ammonium bicarbonate cryst.....	1½ " "
Ammonia water,	
Sulphurous acid,	
Water, of each sufficient.	

Mix two and one-eighth troy ounces of the iodine with the iron wire and eight fluid ounces of water and set the mixture aside, stirring it up occasionally until complete combination has been effected. Decant the light green liquid, wash the residuary iron wire with two fluid ounces of water and unite the washings with the first decantate. To this mixture now add the remaining iodine and when it has wholly dissolved, gradually add the calcium carbonate, facilitating its decomposition towards the last by the application of a gentle heat. Then gradually add the ammonium bicarbonate, heat the mixture until effervescence has nearly ceased and filter it when nearly cooled. Wash

the residue on the filter with water until it is practically freed from ammonium iodide and unite the resulting filtrates. Boil this solution in an open dish until it shows signs of discoloration and add to it 20 minims of sulphurous acid, mixed with 40 minims of ammonia water. Now continue the evaporation at a boiling temperature until a crystalline magma has resulted. Then remove it to a water-bath and proceed with the condensation until a perfectly dry white salt is obtained. Should the salt have acquired free iodine afresh repeat the treatment with sulphurous acid and ammonia.

ANALYSIS OF THE LEAVES OF TUSSILAGO FARFARA, *Lin.*

BY CHARLES S. BONDURANT, PH. G.

(From an Inaugural Essay).

The leaves were carefully freed from the long petioles and other extraneous matter. On account of their tomentose character considerable trouble was experienced in reducing them to No. 80 powder. Moisture determined in a portion of the air-dried drug amounted to 7.8 per cent. This may include a small percentage of volatile oil which was also present.

Fifty grams (50 gm.) were taken for analysis. Complete exhaustion with petroleum spirit yielded 2.18 per cent solid matter at 100° C. On increasing the temperature to 110° C. an acrid volatile oil was driven off in small quantity. The residue after driving off volatile oil, yielded nothing to distilled water. Boiled with absolute alcohol, the solution, on cooling, deposited a small amount of waxy matter of low melting point. Caustic potash was added to the alcoholic solution and after boiling, diluting and acidifying, a small portion separated insoluble in water, showing presence of a small amount of resinous matter. That portion of the petroleum extract, insoluble in absolute alcohol, was caoutchouc, soluble in chloroform, bisulphide carbon and ether, not saponified with strong solution of potassa.

The residue of the original 50 gm. was next macerated with stronger ether until exhausted with that solvent, which extracted 2.63 per cent. solid matter sparingly soluble in distilled water, to which it imparted an intense bitter taste. This aqueous solution contained no tannin, and gave no reaction for alkaloids, but was found to readily reduce Fehling's solution after boiling with dilute hydrochloric acid and neu-

tralizing, thus giving evidence of a glucoside. After evaporating this aqueous solution on a water bath to a small bulk and placing this over sulphuric acid for several days, a white amorphous solid had separated, quite bitter and inodorous, but on boiling with dilute sulphuric acid, a strong odor, similar to that of wetted leather, was evolved. Thus decomposed and neutralized, the liquid reduced Fehling's solution.

That portion of the ethereal extract insoluble in water was treated with hot absolute alcohol which failed to dissolve the whole of the residue. The alcoholic solution filtered and poured into a large quantity of acidulated water, separated a dark brown-reddish resin, which, on drying became brittle, dark red with concentrated sulphuric acid, whitish on the addition of water, and was soluble in concentrated solution of caustic potash. That portion insoluble in boiling absolute alcohol was found to be caoutchouc which had escaped extraction with petroleum spirit.

The residue after exhaustion with stronger ether was macerated for 24 hours with absolute alcohol and filtered. On evaporation an extract remained which amounted to 3.28 per cent., the greater portion of which was soluble in distilled water. The aqueous solution was free from alkaloids, with ferric chloride showed evidences of tannin, and with neutral lead acetate yielded a precipitate containing 2.64 per cent. of organic matter, while gelatin and alum precipitated 2.42 per cent., the difference being probably gallic acid.

The small portion not dissolved by distilled water from the alcoholic extract was found to be resinous and similar in character to that obtained in the ethereal extract.

The petroleum spirits, ethereal and alcoholic extracts were strongly colored green by the chlorophyll present in the leaves. The solutions were distinctly green by transmitted and dark red by reflected light.

The residue from the alcoholic treatment was dried and macerated with distilled water during 24 hours, then filtered and made up to known volume by passing distilled water through the filter. The extracted matter amounted to 11.22 per cent. The aqueous solution, treated with 2 vols. of absolute alcohol precipitated 3.42 per cent. of mucilage; the filtrate concentrated and treated with 4 vols. of absolute alcohol deposited 6.23 per cent. of dextrin and allied carbohydrates, and the filtrate from this on evaporation yielded saponin, insoluble in absolute alcohol, soluble in chloroform, turning purple with concentrated sulphuric acid and yielding frothing solutions with water.

The residue of the powdered leaves left after treatment with water

was next treated with a 0.2 per cent. solution of caustic soda, the filtrate slightly acidified with acetic acid, and mixed with 3 volumes of 95 per cent. alcohol; the precipitate was dried at 100° C., weighed, incinerated, and after deducting the ash, gave 6.21 per cent. albuminous matter present.

The residue of the leaves not dissolved by caustic soda was treated with dilute hydrochloric acid, the filtrate neutralized with ammonia, the precipitate dried, and incinerated to calcium oxide, and calculated to calcium oxalate, amounting to 1.26 per cent.

The residue of the 50 gm. of powder, on being treated with distilled water and chlorine gas, lost 19.42 per cent. of lignin and incrusting substances, the dried residue of 28.43 per cent. constituting cellulose.

A qualitative examination was made of the ash weighing 17.10 per cent. of the powdered leaves; it contained potassium, calcium, magnesium, iron and aluminium, chlorides, phosphates, carbonates and silicates.

GLEANINGS IN MATERIA MEDICA.

BY THE EDITOR.

Digitalin, according to Ph. Lafon, (*Archives de Phar.* 1887, p. 32) is not altered by diastase, pepsin, gastric juice, pancreatic juice, bile, yeast, emulsin or in contact with putrefying substances, and therefore, cannot be altered in the digestive canal; but after it has entered the circulation it appears to be oxidized. Alkalies and mineral acids, with the exception of nitric acid, do not interfere with the detection of digitalin; but this is destroyed by nitric acid.

Cannabis indica has been experimented with by Dr. J. Roux, (*Archives d. Phar.* 1887 p. 1) the preparations having been made by Duquesnel. The drug was exhausted with alcohol, and the alcoholic extract was freed from matters soluble in water which were inert; the remaining green mass was then treated with petroleum benzin and with ether. Of the three extracts thus obtained, that made with ether produced insignificant results. The petroleum extract was found to be excitant and convulsivant, and in the dose of a gram produced coma and in 11 or 12 hours death of the animal. The alcoholic extract has narcotic properties, but its action is uncertain, if small doses are given.

Formation of solanine in potatoes.—Thus far this alkaloid has been obtained only from potatoes while unripe or during the time of sprout-

ing. Dr. Geo. Kassner, of Breslau, reports (*Zeitschr. f. Nahrungs Unt. u. Hygiene*, 1887, p. 22,) that he succeeded in proving its presence and isolating weighable quantities from potatoes which had been injured, and had afterwards been kept for some time in a cellar. In such cases the wound becomes covered with a kind of scurf, beneath which dark colored spots and stripes are usually observed in the white tissue, and the potato has generally a disagreeable taste. It has not been ascertained whether under this circumstance the presence of solanine is due to the vital functions of the tuber, as is the case while sprouting, or whether it must be referred to the action of the fungoid mycelium appearing upon the wound, and regarded as a decomposition product of the nitrogenated constituents of the potato. It would be of interest to ascertain whether the different varieties of cultivated potatoes will always generate solanine under the conditions mentioned above.

Commercial Jalapin has been examined by Edmund White, (*Phar. Jour. and Trans.*, Feb. 12, 1887, p. 651,) who found seven samples to contain between 3.5 and 7.3 per cent. of ether-soluble resin, while an eighth sample was completely soluble in ether, and was probably derived from Tampico jalap. The moisture present in the samples which were in powder and nearly white, amounted to between 2 and 5 per cent., and the alcohol-soluble resin, between 87.8 and 94.8 per cent.

Commercial jalap resin was likewise examined, six samples yielding the following results :

7.8 sol. in ether,	88.2 sol. in alcohol,	trace sol. in water.
7.2 " "	89.2 " "	none " "
8.4 " "	72.4 " "	16.6 " "
77.8 " "	16.6 " "	3.1 " "
25.6 " "	72.0 " "	trace " "
46.0 " "	50.4 " "	none " "

The ether-soluble resins were in all cases plastic and tenacious. Only two of the six resins correspond to the requirements of the pharmacopœia.

The chromate test for quinine, as recommended by Dr. De Vrij, consists in dissolving 5 gm of quinine sulphate in 500 cc. of hot water, adding 1.2 gm. of normal potassium chromate dissolved in a little water, cooling for twelve hours, washing the crystals of quinine chromate upon a filter with distilled water, weighing the crystals and adding for every 100 cc. of filtrate 0.05 gm. of quinine chromate remain-

ing in solution. Dr. O. Hesse shows (*Phar. Jour. and Trans.*, Jan. 22, 1887, p. 585,) that the salt loses water of crystallization between 80° and 90° C., but that when dried in the exsiccator or at 60° C. its molecular weight is 802·5 (not 766·5,) and its formula $(C_{20}H_{24}N_2O_2)_2CrO_4H_2 \cdot 3H_2O$ corresponding with 4·48 per cent. of water of crystallization.

The editor of the *Pharm. Journal* points out that the formula originally suggested for the chromate (anhydrous) shows an excess of between 4 and 5 per cent. of pure quinine sulphate; also that the addition recommended to be made for quinine chromate dissolved, amounts to no less than 5 per cent. of the total quantity of quinine sulphate operated upon, and is equal to the average amount of impurity to be tested for.

Gallois calls attention (*Jour. Phar. Chim.*, Jan. 1887, p. 77,) to a memoir published in 1862, by J. J. André, on the chromates of certain alkaloids, in which it is stated that the neutral anhydrous quinine chromate is soluble at 100° in 160 parts, and at 15° C. in 2400 parts of water; and that neutral potassium chromate precipitates, from solutions of cinchonine and quinidine salts, free alkaloid and acid chromate of alkaloid.

The detection of cocaine in the animal body has been investigated by Dr. L. Helmsing. (*Thesis*, Dorpat, 1886.) On giving 0·3 gm. of the hydrochlorate to a cat, which was strangled after five hours, the alkaloid could be detected in the urine, blood, and all the organs. On decreasing the quantity of the alkaloid, the urine let by the animal gave distinct reactions, but those of the organs became fainter. There appears to be no doubt from the results of the experiments, that cocaine is decomposed in the body, and that the product of decomposition is dissolved from the alkaline urine by benzol, but not by petroleum benzin.

The process of isolation was as follows: The substance was acidulated with sulphuric acid, the mixture agitated with petroleum benzin (benzol and chloroform likewise take up no alkaloid from the acid mixture), then rendered alkaline, agitated with benzol and the solvent evaporated. The reagents employed were iodine, in potassium iodide, which gives a kermes-colored precipitate in solutions 1:100.000; and iodine water, which causes a violet color and turbidity, and if added in excess a kermes-colored precipitate, still distinct with 0·01 mg. of residue. Of the group reagents only potassio-mercuric iodide and phos-

pho-molybdic acid gave precipitates in solutions 1:100,000. Characteristic color reactions were not observed.

Resorcin and Pyrocatechin in the animal economy.—From the experiments of Dr. Joseph Schomacker (*Thesis*, Dorpat, 1886), the following conclusions may be summarized. Both substances given per os or subcutaneously in even relatively small doses, may be detected by Dragendorff's method in the urine and in the different organs. They appear in the urine as sulpho-acids which on boiling with HCl or H₂SO₄ are decomposed liberating resorcin or pyrocatechin; after taking it in large doses, the former is found in the urine also in the free state. The excretion with the urine is completed in about seven hours for resorcin, and in about five hours for pyrocatechin; neither of the two compounds has been found in the feces. Both are best isolated by means of acetic ether, and the most characteristic reagents are chlorinated lime for resorcin, and ferric chloride for pyrocatechin.

The reactions and their limits were ascertained as follows:

Resorcin: .001 gm. with ferric chloride fine violet color, not observable with .0005 gm. Diluted solution of chlorinated lime gives with .00005 gm. a faint reaction, and with .0001 gm. a distinct violet color, gradually becoming yellow; on the careful addition of the reagent these colors may be repeatedly observed, and it is therefore, best added drop by drop. Froehde's reagent produces after some time a violet color with .0005 gm. Sulpho-vanadic acid (1 ammonium vanadate to 100 sulphuric monohydrate) turns blue changing to violet; this change is not very plain with .00005 gm.

Pyrocatechin. .0001 gm. with ferric chloride becomes green, and then on the addition of ammonia, cherry red, blue and violet. Chlorinated lime turns blue-green. Froehde's reagent with .00005 gm. a green color, and with .005 gm. a blue-green color mixed with violet and blue streaks. Sulphovanadic acid with .0001 gm. a blue-green color; or in the presence of sulphuric bihydrate a green color.

Valeriana Hardwickii, Wallich.—An analysis has been made of the rhizome of this East Indian plant, by J. Lindenberg (*Dorpat Pamphl.—Phar. Zeits. Russl.* 1886), and compared with one of *Val. officinalis, Lin.* The direct determination of valerianic acid, total albuminoids, and total water soluble substances gave for the former 1.37, 11.06 and 28.59 per cent. respectively, and for the officinal drug 1.21,

9.38 and 24.88 per cent. The results of the quantitative analysis were :

	V. Hardw.	V. officin.
Moisture.....	10.46	11.57
Ash.....	4.04	4.31
Fat and resin, soluble in petroleum-benzin.....	0.56	0.36
Volatile oil and valeric acid, sol. in benzin.....	1.005	0.90
Volatile acid soluble in ether.....	0.335	0.31
Resin and wax soluble in ether.....	0.56	0.85
Resin soluble in alcohol.....	1.05	0.975
Tannin.....	3.13	1.64
Citric, tartaric and other acids.	0.335	0.565
Glucose.....	6.03	5.32
Other substances, sol. in water, insol. in alcohol.....	14.96	14.39
Mucilage and albumin sol. in water.....	4.16	2.97
Albuminoids extracted by soda.....	9.72	7.83
Metarabic acid, phlobaphene and albuminoids.....	19.10	16.70
Starch.....	14.05	12.87
Cellulose.....	10.36	11.65
Lignin and other compounds.....	10.015	16.80

Butea frondosa, Roxburgh.—The seeds have been analyzed by Nikolai Waeber, (Dorpat Pamph.—Phar. Zeits. Russl. 1886.) The seeds are flat, about $\frac{1}{2}$ inch long, 1 inch broad and $\frac{1}{16}$ inch thick; testa dark reddish brown, veined; hilum projecting; cotyledons broad, leafy, veined; radicle small; taste somewhat bitter. Alkaloids and glucosides were not found. The results of the analysis were: moisture, 6.62; ash, 5.14; fat, 18.20, wax soluble in ether, 0.25; albuminoids soluble in water, 9.12, soluble in soda, 1.95, and insoluble in water and soda, 8.49; substance apparently nitrogenated, soluble in alcohol, 0.82; mucilage, 2.28; glucose, 6.87; organic acids, 4.00; other substances soluble in water, 2.16; metarabic acid and phlobaphen 10.10; cellulose, 3.80, and other insoluble substance, 22.20 per cent.

Ulexine.—The alkaloid discovered by Gerrard in *Ulex europæus*, Lin., has been experimented with by Dr. Pinet (*Arch. Physiol.*, 1887.) It produces convulsions resembling those following nicotine, then sleepiness and cessation of respiration; it appears to affect the nervous, but not the muscular system. It is not an antidote to strychnine, its effects being rapidly produced, but not lasting. See also AM. JOUR. PHAR. 1886, p. 491.

Croton oil.—According to the investigations of H. Senier, from 1878 to 1883, the rubefacient and drastic properties of croton oil reside in two distinct compounds, of which that producing vesication may be

removed by alcohol. Prof. Kobert, of Dorpat, reports (*Chemiker Zeit.*, 1887, No. 28, p. 416,) the results of researches made at his suggestion by Ernst von Hirschheydt, which show that the oil contains Buchheim's crotonoleic acid, partly in the free state and partly as glyceride. The latter is not poisonous, but the free acid is very irritating and drastic. The glyceride being decomposed by the pancreatic ferment, thereby becomes purgative when taken internally; but the same effect may be produced by giving crotonoleic acid in pills covered with keratin with the view of preventing irritation of the stomach; but obviously, irritation of the intestines will be produced by both compounds.

The solubility of croton oil is mainly influenced by the age of the oil, and samples are sometimes met with which dissolve in alcohol in all proportions; but it does not seem necessary that such oils should contain the crotonoleic acid only in the free state, though the acid is readily soluble in alcohol.

For the preparation of *crotonoleic acid* Kobert recommends digestion in a water-bath of the alcohol-soluble portion of croton oil with an excess of concentrated baryta solution; the thick white mass is thoroughly mixed and washed with cold distilled water, whereby coloring matter and barium acetate, butyrate and tiglinat are removed; the residue is drained, dried and exhausted by ether, which leaves behind the barium salts of stearic, palmitic and lauric acids. On evaporating the ethereal solution a mixture of barium oleate and crotonoleate is obtained, of which the latter only is dissolved by alcohol; this solution is decomposed by the careful addition of H_2SO_4 , and after filtering evaporated. The main difficulty for the preparation of free crotonoleic acid lies in the readiness of its being decomposed by baryta water under the influence of too high a heat.

Sodium crotonoleate alters the walls of the blood vessels and causes hemorrhages.

Asclepias currasavica, *A. incarnata* and *Vincetoxicum officinale* were found by C. Gram (*Chem. Centr.* 1886, p. 735) to contain a glucoside, *asclepiadin* which is readily soluble in water, sparingly soluble in alcohol, and is easily converted into the less active asclepin. Harnack's asclepiadin which appears to be identical with Feneulle's asclepin, was obtained from the herbaceous portion of *Ascl. currasavica*. The root of *vincetoxicum* yielded asclepidin, but no asclepin. Of two commercial resinoids of *Ascl. tuberosa* that prepared by Parke, Davis &

Co. consisted of asclepin with a small quantity of a substance having a tetanic action; while that prepared by Keith & Co. was a mixture of asclepiadin, asclepin and asclepion, the latter being a constituent of vincetoxicum and of milkweed.

Mutisia vicicifolia, Cavanilles.—This plant is stated by Mr. Naudin (*Jour. d'Hygiène*, 1886), on the authority of Dr. Sacc of Cochabamba, Bolivia, to enjoy the reputation of curing phthisis and all pulmonary diseases. The plant is indigenous to the western part of South America from Chili to Peru, and belongs to the labiatifloral compositæ which are confined chiefly to South America, and the leaves of which are usually mucilaginous, somewhat bitter, and occasionally more or less aromatic. A number of species are locally used as expectorants.

GLEANINGS FROM GERMAN JOURNALS.

BY GEO. H. OCHSE, PH. G.

Spermaceti is frequently adulterated with stearic acid. To detect the adulteration a definite quantity is fused in a capsule and ammonia added, stirring several moments. Stearic acid forms an ammonia soap which is subsequently decomposed with hydrochloric acid. By this process 1 per cent. of stearic acid can be detected.—*Phar. Zeit. f. Russl.*, xxvi, 249.

Invisible or Postal Card Ink.—16 grams of chloride of cobalt are dissolved in 500 grams of distilled water. The writing on heating turns blue.¹—*Phar. Zeit. f. Russl.*, xxvi, 239.

The following formulas are recommended by Soxhlet (*Neue Erfind. und Erfahrungen*):

Extract of new mown hay.—Cut tonka beans 5·0, orris root 10·0 vanillin, 0·05; oil of bergamot 30 drops; oil neroli, 2 drops; oil rose, 2 drops; oil lavender, 2 drops; oil cloves, 1 drop; patchouly leaves, 0·20; benzoic acid, 0·50; herb urticaria, 2·0; cologne spirit, 207·0. Digest 14 days and filter.

Millefleurs oil for perfuming hair oil and pomade:—Oil cinnamon, 10 drops; oil of neroli, 20 drops; oil of rose, 20 drops; oil of cloves and oil of orange, each 2·0; oil of calamus, 20 drops; oil of geranium, 10·00; oil of lemon, 15·00; oil of bergamot, 15·00; oil of verbena, 5·00.

¹ This is *Hellet's sympathetic ink*, an old preparation. Any soluble cobalt salt may be used, with or without the addition of a little sodium chloride.
—EDITOR.

Extract of reseda:—Cut tonka beans, 2·0; liquid styrax, 1·0; orris root, 50·0; oil of neroli, 10 drops; oil of rose, 10 drops; oil of bitter almond, 2 drops; oil of bergamot, 20 drops, ambergris, 1·0; musk, ·50; herb of urticaria, 2·00; cologne spirit, 250·00. Digest from 8 to 14 days and filter.—*Phar. Zeit. f. Russl.*, xxvi, 240.

Terebene tablets:—Terebene, 15; powdered gum arabic, 12; distilled water, 60; pulverized sugar, 180; powdered tragacanth, 80. Make 100 tablets. The terebene is emulsified with gum and water and then the mixture of sugar and tragacanth added.—*Phar. Zeit. f. Russl.*, xxvi, 191.

Liquid paraffin as an excipient for hypodermic injections.—Dr. Mennier-Lyon has discovered that several substances which, owing to their irritating properties, could not be used hypodermically, lose this disagreeable property when dissolved in liquid paraffin, which to be suitable for hypodermic use must be neutral to litmus-paper; heated to 180°C. no vapors should be evolved, sp. gr. at 150°C. = 0·870—0·895; it should be odorless and tasteless. If corresponding with the aforesaid properties a slight fluorescence does not impair its efficacy, although the German pharmacopœia condemns it. Liquid paraffin dissolves only a limited number of oxygenated compounds, but readily dissolves hydrocarbons, ether, chloroform, fats and fatty oils; menthol, thymol, terpinol, etc., are soluble in all proportions. Large quantities of iodine, bromine, phosphorus and iodoform are also soluble in liquid paraffin. According to Bocquillon, it dissolves four times its volume of sulphuretted hydrogen gas, i. e., more than water is capable of dissolving. Oil of eucalyptus produces abscesses when injected subcutaneously, hence eucalyptol—(so-called absolute eucalyptol obtained by distilling oil of eucalyptus at a temperature of 170°—180°C.) only should be used. One part of eucalyptol is mixed with 4 parts of liquid paraffin. 5 grams of this mixture are injected twice daily. The same proportions are used for myrtol. For iodoform the following method is used: 1 gram of iodoform is dissolved in 20 grams of eucalyptol and 100 grams of liquid paraffin. Of this mixture 5 grams are injected twice daily. Carbon bisulphide 2 to 100 of paraffin oil is used in same doses.

Liquid paraffin will not dissolve water, strong or diluted alcohol, glycerin, methylic alcohol, amylic alcohol, salicylic acid, salts of mercury, terpin, chloral, naphthol, alkaloids, glucosides and iodol. It dissolves but a small quantity of carbolic acid.—*Ph. Post.* xx, page 207.

Piperonal an antiseptic.—Piperonal or heliotropin has been used only in perfumery. It is called heliotropin, because found in the flowers of *heliotropium peruvianum*. Piperonal is obtained by oxidation of piperic acid with potassium permanganate in alkaline solution. Fraggani recommends heliotropin as antiseptic and antipyretic. It is given in doses of 1.0 gram every 2 or 3 hours, or four times a day, even larger doses (2—3 grams) may be given at one dose.—*Pharm. Centralhalle*, xxviii, page 253.

Iodoform plaster, an excellent application to chafed surfaces.—Dissolve pure gelatin 5.0 in hot water 25.0, add glycerin and iodoform of each 1.0.

The plaster is spread on shirting. To use it it is immersed in water and slightly warmed, when it becomes soft and flexible.—*Phar. Centralhalle*, xxviii, page 253.

Uses of saccharin.—Saccharin is almost insoluble in water, its solubility is considerably increased by the addition of bicarbonate of sodium. A small quantity of this saccharin mixture suffices to agreeably sweeten the food and beverages of diabetic patients.

Fahlberg's saccharin-chinin is a mixture of 36 parts saccharin and 64 parts of quinine. Pallatschek recommends the following mixture: Saccharin 1.07, sodium bicarb. 1.2, distilled water 100.0, sulphate of quinine 1.0. *Phar. Centralhalle*, xxviii, page 253.

Bromo-iodinized butter, recommended by Trouseaux, is made as follows: R Potassii iodidi, 0.06; potassii bromidi, 0.25; sodii chloridi, 2.0; butyri recentis, 125.0. The mixture is spread on bread, like ordinary butter.—*Ph. Centralhalle*, xxviii, page 368.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the AMERICAN JOURNAL OF PHARMACY.

CASEIN AS AN EMULSIFIER, is proposed by M. Léger in *L' Union Pharm.* May 15, on account of its permanence and the ease with which it may be handled. To separate it, he treats 4 litres of milk with 60 gm. ammonia for 24 hours and, after removing the saponaceous matter from the surface of the mixture, precipitates the serum with acetic acid. The magma of casein, strongly pressed, is treated with sodium bi-carbonate, with a sufficient quantity of sugar to make the dried product contain one-tenth of its weight of casein. The powdered substance dissolves easily in water and, mixed with its weight of gum, may

be used for almost all of the emulsions. Resinous matters and balsams previously dissolved in alcohol, essences and oils, may be mixed with it in the bottle itself without using the mortar. The only defect in this saccharate of casein is its slight animal odor, which, it is believed, can be counteracted.

GUMMO-PHOSPHATE OF CALCIUM.—M. Sambuc (*Jour. de Phar.*; *Arch. de Phar.*, June) says that the preparations in use under the names of chlorhydro-, lacto-, and citro-phosphate of calcium, are not double salts, but mixtures of mono-calcic phosphate with chloride, lactate or citrate of calcium. Five gm. for instance of the phosphate are usually found mixed with six gm. of chloride of calcium. He proposes to replace the hydrochloric, lactic or citric acids with gummic acid. As is well known, 100 gm. of arabic gum contains 0.97 of lime, 0.63 gm. of potassa, and 0.27 gm. magnesia; these quantities of potassa and magnesia correspond to 0.78 gm. of lime; 100 gm. of gum contains therefore a sufficient quantity of gummic acid to combine with 1.75 gm. (0.97 gm. + 0.78 gm.) of lime, and, consequently to render soluble 10 gm. of bicalcic phosphate which contain 3.50 gm. of lime, of which one half remains combined with the phosphoric acid. On these bases M. Sambuc proceeds to isolate the gummic acid by dialysis, using 300 gm. cleaned gum, 600 gm. water, and 24 gm. ac. hydrochlor. at 1.18. In two days the calcium, potassium and magnesium are eliminated by exosmosis, and the dialyser contains only a solution of gummic acid. He then takes 66 gm. phosphate of sodium (before efflorescence), and 40.50 gm. crystallized calcium chloride, dissolves separately and mixes. After washing and draining he mixes it while yet damp, with the dialysed solution of gummic acid which dissolves it readily. The quantities given, produce 32 gm. bicalcic phosphate. The product is feebly acid; it contains gummate of calcium which advantageously replaces the salts of calcium mixed with the monocalcic phosphate in the composition first indicated. M. Sambuc's preparation does not keep well. If a method could be devised for making it permanent, the gummo-phosphate of calcium might prove very useful.

SOLUTIONS OF MAGNESIUM CITRATE are, according to M. Reeb (*Bull. Com.*, May), less likely to show a precipitate when the carbonate is added to the acid than when the acid is added to the carbonate. He also gives a formula for concentrated citrate of magnesium as follows: boracic acid 100, citric acid 600, carb. magnesium 360, distilled water 4,000. This, he says, keeps unchanged even in winter. It might be

a handy formula for the pharmacist to use for customers who are not acting under advice, but as the *Bulletin* editor points out, "It is not permissible to modify the officinal formula of medicaments without the knowledge of the physician; and this doctrine is based not only in the interest of the patient, but the security of the pharmacist, who might be compromised on account of modifications which to him appeared legitimate enough." M. Reeb's idea about the introduction of boracic acid is interesting however: "It is very evident that the boracic acid can cause no therapeutic difficulty because, administered in a purge it has no time to become absorbed. Besides, is not the borated potassic tartrate a purgative in good usage?" Well, he might on the same grounds dispense rhubarb for castor oil.

ANEMONE PULSATILLA. In some observations upon this plant (*Gaz. Hebdom.*, May 27, June 3), P. Vigier adds little to our knowledge of it, but does something negatively for science by making no claim for its medicinal virtues beyond its sedative effect and the fact that, taken internally, it reduced the catarrhal fever of a cold in the head and nearly stopped the nasal secretion. He states that the distillations when bottled and put aside lose their bad odor and acridity and deposit anemonin. Alkalies dissolve it readily, making anemonates. He finds the atomic formula to be $C^{15}H^{12}O^6$ [agreeing with Fehling], the anemonic acid having one more equivalent of oxygen. "A curious peculiarity is that hydrochloric acid dissolves the anemonin without altering it, whilst nitric and sulphuric acids destroy it rapidly." He has often taken 10 centigm. of it without toxic effect; 2 to 4 centigm. a day were enough to get the anti-catarrhal effect and that on the nervous system. The leaves lose their properties by dessication; the roots do not, and these possess the medicinal properties of the plant in a much higher degree. They are gathered in June. Equal parts by weight of the root and alcohol at 90 are macerated for fifteen days. The mixture keeps well. The dose is 2 to 4 gm. a day—less than that of the tincture made from the leaves. He proposes a syrup of syr. aurant. flor. 95 gm. and tincture (as above) 5 gm.; two to four gm. daily, in water.

POISONING BY ANILINE is common enough, but cases of death from it, giving the dose and the autopsy, are rarely met with. Fr. Muller (*Deut. Med. Woch.*; *Arch. Gén. de Méd.*, June, 1887) reports such a case, and compares the toxic effects of the aniline with those of its derivative antifebrine. Both substances caused a cyanosis, espe-

cially marked in the lips, nose, chin, around the eyes and in the extremities. In three cases treated with antifebrine, and in the one poisoned by aniline, the spectroscope gave the methemoglobin ray. The urine of the latter case, and of a rheumatic treated with antifebrine, showed paramidophenol. The poisoned person (a woman of 33) swallowed 25 ccm. of aniline. She became comatose, absolutely insensible; pupils fixed, limbs flaccid, irregular pulse, and marked cutaneous and muco-membranous cyanosis; there was much vomiting with odor of aniline. Cutaneous and ether injections gave no result. Died next day. Autopsy: Blood was chocolate brown; spectrum showed 2 oxyhemoglobin and the methemoglobin ray. Urine contained no albumen, sugar or blood; distillations gave aniline reactions: lemon yellow with ac. hydrochlor.; violet with calx chlor.; greenish blue with ac. sulphuric and pot. chlorate; bright blue with sol. kairine. Paramidophenol was present. Acid hydrochloric, phenic and chromic gave a red color; ammonia the bright blue of indophenol. There were ecchymoses and extravasations in various tissues and organs.

COCAINE, to facilitate the operation of washing out the stomach, and also to quiet gastric pains, is recommended by Dujardin-Beaumetz (*Prog. Méd.*, May 28) to be used in a formula as follows: Water, 300 gm.; cocaine hydrochlor., 50 cgm.; dose, 2 tablespoonfuls every quarter of an hour, or until the cessation of pains or vomitings. In similar cases the following gives equally good results: Water saturated with chloroform, 150 gm.; tr. anise and illicium, of each, 5 gm.

LACTIC ACID IN THE GREEN DIARRHŒA OF CHILDREN.—Prof. Hayem (*Bull. Gén. de Thérap.*, May 30) considers the malady of microbian origin. He finds lactic acid remarkably useful in its treatment, administering it in the form of a 2 to 100 solution, a teaspoonful being given to the child a quarter of an hour after nursing. During the twenty-four hours 5 to 8 teaspoonfuls may be given, representing 40 to 60 gm. of pure lactic acid. It is well supported.

IODATED COTTON.—M. Quinard has improved upon his cold process of making iodated cotton (*Arch. de Pharm.*, June). He scatters the finely pulverized iodine over it as evenly as possible, and, placing it in a wide-mouthed glass-stoppered flask, exposes it to light, or, if possible, to the sun. In a week the iodine vaporizes and forms upon the cellulose.

NEW COLORING FOR WINE.—M. Portes is reported (*Archiv. de Phar.*, June), as showing to the *Société de Pharmacie* a new coloring material for wines, sold as “a colorant undiscoverable by chemists.” M. Portes found it to consist of a mixture of tropæoline, sulphate of fuchsine and indigo-carmin. He first treated the coloring substance with boiling amylic alcohol which dissolved the tropæoline; the residuum, treated with alcohol, dissolved the fuchsine, and the final residuum treated with water, dissolved the indigo-carmin. Wines colored with the substance show, precisely like natural wines, a greenish reaction when treated with ammonia. This is explained by the fact that the reagent bleaches the fuchsine, leaving the blue and yellow matters, which mixing together give the green color. The coloring substance is not easy to detect in wine, the fuchsine alone being easily separated.

(The following are from a report by Dr. Zinowiew, (*Bull. Gén. de Thérap.*, May 30.) of the proceedings of the Second Congress of Russian Physicians at Moscow, early in the year.)

URETHANE.—Lagowoi finds it very useful in insomnia arising from nervous excitability, but it is less pronounced in its effects where there is local pain. It is indicated in delirium tremens, and some forms of mania and melancholia; also to combat the cerebral phenomena of typhoid. The dose varies between 1·0 and 4·0. Urethane augments the number of respirations, but has no action on the pulse and temperature. The sleep produced is tranquil and is followed by no disagreeable sensations.

MERCURY INJECTIONS.—Sirsky reports 300 cases treated with 7000 hypodermic injections of mercury. Stomatitis very rarely appeared and no abscesses were formed. In 5 cases there was superficial cutaneous gangrene, caused by penetration into the true skin. Sirsky injected but 15 centigm of mercury to the dose, and used soluble salts exclusively. To make the injections wholly painless he sometimes added to the mercury solution a solution of 1 to 100 of cocaine nitrate.

ANTAGONISM OF STRYCHNINE AND ALCOHOL.—The results of Jarochevsky's recent experiments on dogs, are summed up as follows: Strychnine prevents alcoholic inebriation; at the same time it enables the organism to support large doses of alcohol for a very long time; it preserves the organs (liver and vessels) from the characteristic alterations produced by alcoholism. The action of strychnine is, up to

a certain limit, paralyzed by alcohol; beyond this limit, strychnine becomes poisonous to the inebriated animal. Strychnine is an excellent medicament in all forms of alcoholism. It is also a powerful prophylactic.

PRACTICAL NOTES FROM VARIOUS SOURCES.

BY THE EDITOR.

Linimentum terebinthine, Br.P.—The addition of more than the pharmacopoeial quantity of water with the view of avoiding separation in the liniment (see AM. JOUR. PH., 1886, p. 428) is likely to interfere, more or less, with the absorbent action of the turpentine; but, according to G. E. Perry (*Phar. Jour. Trans.*, April 30, 1887, p. 899), a therapeutically and pharmaceutically satisfactory liniment is obtained by using more soap and less water, and manipulating as follows: Dissolve in a bottle camphor 1 oz. in oil of turpentine 16 fluidounces, add soft soap 4 ozs. and water 1 oz., and shake. Thus made it is an elegant creamy emulsion, remaining sufficiently liquid, and though a slight separation will take place after a time, it is practically permanent.

Permanent solution of mercuric chloride.—Dr. A. C. Bernays states (*Weekly Med. Rev.*, May 14, 1887, p. 558) on the authority of Dr. Stuetz of Jena, that by adding $7\frac{1}{2}$ grains of citric acid to each quart of water used in making solution of bichloride of mercury there would be no reduction of the Hg Cl_2 , and also no precipitate when albuminoid solutions are admixed.

Blaud's pills.—The paper of Mr. W. Duncan (See May number, p. 235) has called forth two communications which were read April 13, at Edinburgh, before the Pharmaceutical Society of Great Britain (*Phar. Jour. Trans.*, April 23, pp. 864–866). Peter Boa gives the following formula: Rub granulated (precipitated) ferrous sulphate, 30 grains, with sugar 10 grains, add potassium carbonate (15 to 16 p. c. H_2O), 20 gr., triturate, add powdered tragacanth, 3 gr., and beat into a mass for twelve pills. The beating required is considerable, but nothing else is needed to make a mass which rolls easily if not allowed to lie. These pills keep for any reasonable time with only a trifling loss of ferrous salt; it is unnecessary to coat them.

Thos. Thompson suggests the use of gelatin capsules, the two exsiccated salts to be incorporated separately, with almond oil, then mixed and

put into capsules. Or 24 pills may be made according to the following formula :

Exsiccated sulphate of iron.....	36 grains.
Anhydrous carbonate of potassium.....	30 "
Powdered sugar of milk.....	25 "
Pulverized tragacanth.....	10 "
Castor oil sufficient.	

The mass is not easily rolled out; but after the pills have been made two days they may be coated with gelatin, and will then keep without any decomposition taking place.

Standard extract of belladonna, containing 2 per cent. of total alkaloid, is proposed by Prof. Dunstan and Francis Ransom to be prepared as follows (*Phar. Jour. and Trans.*, April 16, 1887, p. 843): macerate belladonna root in No. 20 powder, 1 pound, with 40 fluidounces of a mixture of alcohol 48 fluidounces and distilled water 12 fluidounces; after two days transfer to a percolator, displace by adding the remaining liquid, express, filter, mix and measure the exact volume of the tincture, of this evaporate 50 cc. over a water-bath, until the alcohol is dispelled; dissolve the extract in 5 cc. of warm distilled water acidulated with dilute hydrochloric acid; filter through a little cotton wool into a suitable separator; add ammonia until distinctly alkaline, and agitate with 5 cc., and afterwards with 3 cc. of chloroform. Mix the chloroformic solutions and agitate this with 5 cc., and then with 3 cc. of dilute hydrochloric acid; mix the acid solutions, render alkaline with ammonia, and agitate as before, with 5 cc. and 3 cc. of chloroform. Evaporate the chloroformic liquid, dry the residue at 200° F. (it should then be nearly colorless), weigh carefully, and calculate the total amount of alkaloid present in the tincture. Evaporate this to dryness over a water-bath and add sufficient sugar of milk to make the mixed product exactly fifty times the weight of the total alkaloid found to have been present in the tincture. Mix intimately, powder and transfer at once to a well stoppered bottle.

Purity of ether.—The present British Pharmacopœia directs that ether shaken with solution of potassium iodide and starch paste should produce little or no blue color. Prof. Dunstan and T. S. Dymond have investigated this test (*Phar. Jour. Trans.*, April 16, 1887, p. 841), and found that ether prepared from sodium ethoxide and ethyl iodide, does not liberate iodine from potassium iodide, until after about three hours traces of it are set free; but hydriodic acid at once caused the liber-

ation of iodine. Ether prepared from sulphuric acid and alcohol liberates iodine from strong solutions of potassium iodide, and very slowly from dilute solutions, the reaction being accelerated by the presence of acid. The reaction is not due to ozone, for on agitating the ether with mercury or silver the filtrate had the same behavior before. On warming the ether with solution of sodium carbonate, neither the escaping gas nor the remaining ether had any effect upon potassium iodide. The presence of *hydrogen peroxide*, thus indicated, was shown by shaking the ether with a very dilute solution of potassium chromate acidulated with sulphuric acid, when the ether separated of a deep blue color, due to perchromic acid. Some commercial ethers, particularly if made from methylated spirit, contain an impurity which forms H_2O_2 after a short time, and this may then be detected by the perchromate test. The quantity of H_2O_2 amounted to only .04 per cent. determined from the iodine liberated. The impurity may be removed by treating the ether with excess of lime and washing the distillate with alkaline water.

PREPARATION OF SURGICAL DRESSINGS.

The French military authorities have caused steps to be taken for purifying *charpie* before rendering it antiseptic, and the mode of imbuing it with the several kinds of antiseptic preparations are laid down with great precision. To purify the charpie, four litres of boiling water are to be poured on each kilogram; this is to be allowed to cool, and the charpie is then to be removed and washed freely in fresh water until the water passes off perfectly clear. The charpie, after the water has been pressed out, is next to be soaked for three-quarters of an hour in six litres of a solution, 1 in 30, of chloride of lime, and again washed in water until all odor of the chloride has disappeared. The charpie is then put into six litres of dilute hydrochloric acid, 1 in 30, and, half-an-hour afterwards, is withdrawn and washed, until it does not redden litmus paper. It is now pressed, dried, and rubbed until it is sufficiently supple. The following are the preparations employed for rendering the purified charpie antiseptic.

For the *mercurial charpie* (*charpie bichlorurée*) 1 gram of the bichloride of mercury is dissolved in 100 grams of alcohol; and this solution, together with 10 grams of glycerin and 10 grams of Senegal gum, is added to $2\frac{1}{2}$ kilograms of distilled water. Into this solution

1 kilogram of the purified charpie is plunged; and, in order to distribute the bichloride throughout its substance, the liquid is pressed out and reabsorbed several times. It is then withdrawn, dried, and packed.

To prepare the *boric charpie*, 100 grams of crystallized boric acid are dissolved in a sufficient quantity of water; 100 grams of glycerin and 20 grams of Senegal gum previously dissolved, are added to the solution, and pure water is added to make up the amount to 2½ kilograms. One kilogram of charpie is treated in this solution in the same manner as has been described with the mercurial charpie.

To prepare the *carbolyzed charpie*, two plans are given, but the following is the one recommended as the most simple and equally effective. A layer of the purified charpie is laid on a piece of oiled silk (*taffetas gommé*) and over this is placed a piece of filtering paper of sufficient size. The paper is sprinkled with carbolic acid dissolved in alcohol of 95° strength. The whole is then rolled up in the oiled silk, secured firmly by cord, and placed in a chamber at a temperature ranging from 68° to 77° F. If the charpie is required to be carbolyzed 10 per cent., the blotting-paper is sprinkled with 100 grams of the carbolic acid dissolved in 50 grams of alcohol at 95°; if 5 per cent., then with 50 grams of the carbolic acid in 50 grams of alcohol at 95°. —*Brit. Med. Jour.*, March 12, 1887; *Quart. Therap. Rev.*

IRISH MOSS AS A SUBSTITUTE FOR GUM ACACIA IN PHARMACY.*

By PETER BOA.

At the present time when the price of gum arabic is about five times what used to be considered its normal value it seems not inappropriate to introduce for consideration a subject such as I have to bring before you to-night. A mucilage of Irish moss, prepared by boiling in water, has been largely used in America for the emulsification of cod liver oil, but so far as I have been able to ascertain by liberal reference to journals published in that country and in this, its more extended pharmaceutical use has not been proposed.

Some years ago I made experiments with the moss mucilage as an emulsifier of cod liver oil, but my experience with it did not indicate

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Wednesday, May 11. Reprinted from *Phar. Jour. and Trans.*, May 21, p. 941.

any evidence of its superiority to other substances used for the same purpose, such as acacia and tragacanth. In consequence I abandoned further consideration of it, especially as the cost was not then an element of so urgent importance as it is now.

A few months since, however, in conversation with a pharmaceutical friend, the subject of a substitute for acacia came up. Remembering my previous experiments with Irish moss I thought this substance might possess some qualities which would make it worth considering with this object in view. Since then I have from time to time as leisure permitted gone into the subject, and the results of my experiments, so far as they appear to me to be worth recording, I propose to lay before you.

The only two British species of algæ which yield a mucilaginous jelly with water are *Gelidium corneum* and *Chondrus crispus*, or Irish moss. The latter is the more plentiful, and being a well-known article of commerce is easily obtainable. The composition of commercial Irish moss is given by Church as—

Water	18.8
Albuminoids.....	9.4
Mucilage	55.4
Cellulose.....	2.2
Mineral matter.....	14.2
	<hr/>
	100.0

Stanford says it yielded him 63.7 per cent. of carrageenin, or vegetable jelly; this probably includes the albuminoids and mucilage given in Church's analysis.

The mucilage may be obtained by boiling, by heating on a water-bath, and by cold maceration. The usual method is boiling. However, having put a quantity of the moss into water to soak one afternoon, and being unable to attend to it till the next day, I found when I examined it that the water was distinctly viscous. By putting a larger quantity of moss into a smaller quantity of water, and macerating with occasional gentle stirring for twenty-four hours, I obtained a mucilage of about three-fourths the viscosity of acacia mucilage.

At the commencement I encountered a difficulty which threatened to be a serious objection. I found it exceedingly troublesome to get the mucilage clear, the insoluble particles suspended in it being so minute that the straining medium necessary to exclude them required to be so fine that the mucilage would scarcely pass through it. Mr.

Husted (*Pharm. Journ.*, July 16, 1881, p. 49) records similar experience. In a case where the small particles in suspension would not be objectionable, a fairly presentable product may be obtained by using muslin or calico as the straining material, and gently stirring or pressing. For emulsions this serves admirably. In a clear mixture, however, the particles become objectionably evident when the mucilage is diluted. To obtain a clear preparation Mr. Husted recommends that the mucilage while hot should be poured into a flannel filtering-bag and allowed to drain through, no pressure or stirring being employed. Proceeding in a similar way I failed to get satisfactory results. I could neither get the mucilage to run through reasonably rapidly nor obtain it so clear as I desired. It may be that Mr. Husted's manipulation is superior to mine, or his mucilage was not so clear as that which I have now succeeded in preparing. After many failures, the details of which I need not give, I found that by using a hot water funnel and straining the mucilage through absorbent cotton wool supported on muslin, a preparation clear enough for all but exceptional purposes could be obtained with comparatively little difficulty. If a perfectly water-clear preparation be required, it may be obtained by making a weak mucilage, filtering it clear, and then evaporating to the thickness required. If a clear jelly were wanted this would be the only way to prepare it, because a decoction of this consistence could not be strained, even when kept hot, in anything like a reasonable time, if at all.

A quarter of an ounce of moss, washed free from dust and sand, soaked in 24 ozs. of cold water for an hour or so, boiled gently for five minutes or heated on a water-bath for double the time, and strained in the manner I have described, yields about 18 ozs. of mucilage closely resembling in appearance and viscosity the acacia preparation, and possessing as little taste.

I have observed that the clear mucilage has less taste,—“flavor” perhaps I should say,—than that which has not been freed from insoluble particles.

A quarter of an ounce macerated in 4 ozs. of cold water for twenty-four hours, or longer, gives a mucilage such as that to which I have already made reference.

Specimens of these and of some other strengths are on the table. I have observed variations in the results from different parcels of the moss.

Comparing the moss mucilage with acacia mucilage in combinations, I find that it serves as well as the latter for chalk mixture. Guaiac. mixture made with it does not soon acquire a greenish tinge as that made with acacia : oxidation appears to be retarded and presumably the moss is therefore to be preferred. For suspending copaiba it is superior to acacia, separation taking place much more slowly and less completely. Part of the copaiba remains in an emulsified state at the bottom of the bottle when moss is used, but with acacia the liquid in the lower part of the bottle is free from anything of that kind, all the oleoresin having risen to the top.

For emulsifying cod liver oil it is greatly superior to acacia in point of preventing separation, but a finer division of the oil can be obtained by the use of acacia in greater proportion than the equivalent.

Moss mucilage, ʒvj., cod liver oil, ʒj., and water ʒij., produce an emulsion that is practicably inseparable. Using ʒvj. acacia mucilage, ʒj. cod liver oil, and ʒij. water, the product obtained quickly separates.

It should not be used for suspending heavy powders without some caution, for I find that when it is employed to suspend subnitrate of bismuth, the bismuth when once it settles down will not again shake up. Where there is no objection of this kind it is superior to ordinary mucilage.

Specimens are shown illustrative of the results of these comparative experiments.

In regard to compatibility moss mucilage forms a clear jelly with subacetate of lead solution ; it is miscible with rectified spirit and dilute nitric acid ; perchloride of iron gives a slight gelatinous precipitate.

The preparation keeps good for some weeks in full bottles without any preservative. One specimen is shown that has been kept in a partially filled bottle in the front shop for two months and it can hardly be said to be bad ; other specimens, however, of about the same age have become mouldy on the top. It does not sour like acacia mucilage.

Pereira says that *Chondrus crispus* has a popular reputation for pulmonary complaints, chronic diarrhœa and irritation of the kidneys and bladder. The mucilage strikes one as being well suited for use with medicines for any of these complaints ; a few ounces of it in a cough mixture, for example. It may be used freely, for it is readily digested—the melting point of the jelly being 80° F., not much above that of isinglass jelly used for invalids.

AMERICAN PHARMACEUTICAL ASSOCIATION.

The Thirty-fifth Annual Meeting of the American Pharmaceutical Association, will be held at the centrally located "Odeon," one of the best appointed halls, in the city of Cincinnati, Ohio, on Monday, September 5th, 1887, commencing at three o'clock P. M. All local Associations of Pharmacists are entitled to accredit five delegates whose credentials should be sent, at least two weeks before the meeting, to the Permanent Secretary, John M. Maisch, 143 North Tenth Street, Philadelphia, Pa. To save valuable time at the first session, the delegates from Colleges of Pharmacy and from State Pharmaceutical Associations may communicate their appointments—one member each—for the Nominating Committee, previous to the opening of the meeting.

Applications for membership should be sent with the requisite fees as early as possible to the Chairman of the Committee on Membership, Geo. W. Kennedy, Pottsville, Pa.

It is desirable that the Committee on Papers and Queries be informed at an early date of the titles of papers designed to be read at the meeting. Authors of papers and chairmen of committees, prevented from attending, may send their essays and reports to the care of the Local Secretary, Mr. Geo. W. Voss, Eighth and Depot Streets, Cincinnati.

Applications for grants from the interest of the *Centennial Fund* for defraying the expenses of suitable investigations (see Chapter vii, By-laws of Council), should be addressed to the committee consisting of the President of the Association, the Chairman of the Finance Committee, Jos. L. Lemberger, Lebanon, Pa., and the Permanent Secretary.

The Committee on Arrangements—the Local Secretary, Geo. W. Voss, Chairman—is endeavoring to provide for the accommodation, comfort and entertainment of the members, while traveling to, and during their stay at Cincinnati, where the headquarters will be at the Grand Hotel. Further information concerning the meeting and arrangements made will be found in the circular of the Permanent Secretary to be issued in August.

CHARLES A. TUFTS,

Dover, N. H., June 23, 1887.

PRESIDENT.

Iodoform and silver.—Poncet (*Lyon méd.*, 1886, No. 31,) draws attention to the discomforts sometimes associated with the use of iodoform when articles of silver are used in eating. A peculiar nauseous taste is often present which is increased when food is taken. The tongue sometimes becomes coated. Poncet points out that articles of silver in contact with iodoform acquire a peculiar smell, and is of the opinion that patients, whose wounds are dressed with iodoform ought not to use silver forks and spoons to eat with. According to Cazeneuve, when iodoform and silver come into contact, iodide of silver and acetylene are formed, and to this he attributes the effects which Poncet has pointed out.—*Med. Chronicle*, March 1887.

PHARMACY LAW OF PENNSYLVANIA.

An Act to regulate the practice of Pharmacy and sale of Poisons and to prevent Adulterations in Drugs and Medicinal Preparations in the State of Pennsylvania.

WHEREAS The safety of the public is endangered by want of care in the sale of poisons, whether to be used as such for legitimate purposes or employed as medicines and dispensed on the prescriptions of physicians;

AND WHEREAS The ability of physicians to overcome disease depends greatly on their obtaining good and unadulterated drugs and properly prepared medicines;

AND WHEREAS The person to whom the preparation and sale of drugs, medicines and poisons properly belong, known as apothecaries, chemists and druggists or pharmacists, should possess a practical knowledge of the business and science of pharmacy in all its relations; Therefore

SECTION 1. *Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same:* That hereafter no person whomsoever shall open or carry on as manager in the State of Pennsylvania any retail drug or chemical store, nor engage in the business of compounding or dispensing medicines or prescriptions of physicians, or of selling at retail any drugs, chemicals, poisons or medicines, without having obtained a certificate of competency and qualification so to do, from the State Pharmaceutical Examining Board, and having been duly registered as herein provided.

SECTION 2. That there shall be established in the State of Pennsylvania a Board to be styled The State Pharmaceutical Examining Board, to consist of five persons, three of whom shall constitute a quorum, who shall be appointed by the Governor from among the most skillful retail Apothecaries actually engaged in said business in the State of Pennsylvania, and who must have had ten years practical experience in the same, one to serve five years, one four years, one three years, one two years and one one year, in the first instance; and thereafter annually the Governor shall appoint one person to serve as a member of said Board for the term of five years. The said persons so appointed shall be and constitute the said The State Pharmaceutical Examining Board, and shall hold the office for the term for which they were appointed or until their successors are duly appointed and qualified, and shall receive as a compensation for their services five dollars for each day actually engaged in this service, and all legitimate and necessary expenses incurred in attending the meetings of said board under the provisions of this act; and no part of the salary of said board or expenses thereof shall be paid out of the state treasury.

The said board shall organize by electing one of its members secretary, who in addition to his compensation as a member of said board shall receive a further sum not to exceed one hundred dollars annually, for his services as secretary.

They, the said board and each of them shall within ten days after their appointment, or being apprised of the same, take and subscribe an oath or

affirmation before a properly qualified officer of in the county which they reside, that they will faithfully and impartially perform the duties of their office.

Any vacancies occurring in said board shall be filled by the Governor of the State of Pennsylvania from among such only as are eligible for original appointment.

SECTION 3. The said The Pharmaceutical Examining Board shall keep a book of registration open at some convenient place of which due notice shall be given by advertisement in at least four newspapers in the state, and so divided as to reach as nearly as practicable all parts thereof, in which book shall be registered the name and address of each and every person duly qualified under this act to conduct and carry on the retail drug and apothecary business, or to hold the position of qualified assistant therein. And it shall be the duty of all persons now conducting or who shall hereafter conduct the business of retail apothecaries, or those acting in the capacity of qualified assistants therein, in said state, to apply to said board and be registered as such within ninety days after such notice, and thereafter every three years. Application for registration only may be sent by mail to the secretary of the examining board after being properly attested before a notary public or any other person authorized to administer an oath or affirmation in the county in which the applicant resides.

The form of application shall be subject to such regulations as the board may see proper to adopt, but in no case shall the applicant be put to any unnecessary expense in order to secure registration.

SECTION 4. The said board shall be entitled to demand and receive from each applicant for examination and registration and for the certificate hereinafter provided, a fee not to exceed two dollars, and for registration only, a fee not to exceed one dollar in the first instance, and for renewing the same every three years a fee not to exceed one dollar; and the amount derived from this source shall be held by said board and be applied to the expenses and salaries herein provided and such as may arise under the provisions of this act, and they, the said board, shall report annually to the Governor of the State of Pennsylvania all moneys received and disbursed under the provisions of this act, together with the number of pharmacists registered under this act.

SECTION 5. That it shall be the duty of said board to meet once every three months in the city of Harrisburg, or at such other place as they may deem expedient, and examine all persons who shall desire to carry on the business of a retail apothecary or that of retailing drugs, chemicals, or poisons, or of compounding physicians' prescriptions, touching their competency and qualifications; and they, the said board, or a majority of them, shall grant to such persons as may be qualified, certificates of competency or qualification which shall entitle the holders thereof either to conduct or carry on the business, or to act as a qualified assistant therein, as may be expressed upon the said certificate, and such certificate together with its renewals shall be good and sufficient evidence of registration under this act.

All persons applying for examination for certificate to entitle them to conduct and carry on the retail drug or apothecary business, must produce satisfactory evidence of having had not less than four years' practical experience in the business. And those applying for examination for certificates as qualified assistants therein, must produce evidence of having not less than two years' experience in said business.

SECTION 6. That no person shall hereafter engage as manager in the business of an apothecary or pharmacist, or of retailing drugs, chemicals, and poisons, or of compounding and dispensing the prescriptions of physicians, either directly or indirectly, without having obtained such certificate as aforesaid. But nothing contained in this act shall in any manner whatever interfere with the business of any practitioner of medicine, nor prevent him from administering or supplying to his patients such articles as to him may seem fit and proper, nor shall it interfere with the making and dealing in proprietary remedies popularly called patent medicines, nor prevent storekeepers from dealing in and selling the commonly used medicines and poisons, if such medicines and poisons conform in all respects to the requirements of section nine, provided the provisions of section ten of this act be fully complied with.

Any person who shall violate or fail to comply with the provisions of this section shall be guilty of a misdemeanor and on conviction before any court, shall be punished by a fine not exceeding one hundred dollars, or be imprisoned in the county jail of the proper county, for a term not exceeding one year, or either, or both, at the discretion of the court.

SECTION 7. That the foregoing provisions of this act shall not apply to, or affect any person who shall be engaged in the retail drug and apothecary business, as proprietor of the same, or as qualified assistant therein, at the passage of this act, except only in so far as relates to registration and fees provided in sections three and four of this act.

A qualified assistant engaged in the business at the passage of this act, is one who has had not less than two years' practical experience in the retail drug and apothecary business. All other assistants actually engaged in the business at the passage of this act shall, upon the completion of a like term of two years experience be entitled to registration as qualified assistants without examination.

SECTION 8. That no person shall be allowed by the proprietor or manager of any store or place where prescriptions are compounded, to compound or dispense the prescriptions of physicians, except under the immediate supervision of said proprietor or his qualified assistant, unless holding a properly certified certificate of registration or competency from the State Pharmaceutical Examining Board as herein provided, and any person violating the provisions of this section shall be deemed guilty of misdemeanor, and on conviction thereof, shall be punished by a fine not exceeding one hundred dollars.

SECTION 9. That no person shall knowingly, willfully or fraudulently, falsify, or adulterate, or cause to be falsified or adulterated, any drug or medical substance, or any preparation authorized or recognized by the

pharmacopœia of the United States, or used or intended to be used in medicinal practice, nor mix or cause to be mixed with any such drug or medicinal substance any foreign or inert substance whatsoever for the purpose of destroying or weakening its medicinal power and effect, and willfully, knowingly or fraudulently sell or cause the same to be sold for medicinal purposes.

Any person who shall violate this section shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding five hundred dollars, and shall forfeit to the commonwealth all articles so adulterated.

SECTION 10. POISONS. A poison in the meaning of this act shall be any drug, chemical or preparation which, according to standard works on medicine or materia medica is liable to be destructive to adult human life in quantities of sixty grains or less.

No person shall sell at retail any poisons except as herein provided without affixing to the bottle, box, vessel or package containing the same, a label printed or plainly written containing the name of the article, the word "poison," and the name and place of business of the seller, nor shall he deliver poison to any person without satisfying himself that such poison is to be used for legitimate purposes.

It shall be the further duty of any one selling or dispensing poisons which are known to be destructive to adult human life in quantities of five grains or less, before delivering them, to enter in a book kept for this purpose the name of the seller, the name and residence of the buyer, the name of the article, quantity sold or disposed of, and the purpose for which it is said to be intended; which book of registry shall be preserved for at least two years, and shall at all times be open to the inspection of the coroner or courts of the county in which the same may be kept.

The provisions of this section shall not apply to the dispensing of physicians' prescriptions specifying poisonous articles, nor to the sale to agriculturists of such articles as are commonly used by them as insecticides. Any person failing to comply with the provisions of this section shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine not less than five, nor more than fifty dollars for each and every offense.

SECTION 11. Any graduate of an accredited medical college who has had not less than three years continuous practice since the date of his diploma, and who is registered as a practitioner of medicine and surgery under the act entitled "An act to provide for the registration of all practitioners of medicine and surgery," approved the eighth day of June, Anno Domini one thousand eight hundred and eighty-one, may be registered under this act without examination, and be granted a certificate which shall entitle him to conduct and carry on the retail drug or apothecary business as proprietor or manager thereof, subject to fees provided in sections three and four of this act.

SECTION 12. It shall be the duty of the State Pharmaceutical Examining Board to investigate all complaints and charges of non-compliance or vio-

lation of the provisions of this act, and prosecute all persons so offending, whenever there shall appear to the board reasonable ground for such action.

SECTION 13. That all acts, and parts of acts, so far as they may be in conflict with this, are hereby declared void and of no effect.

Approved by Governor Beaver, May 24, 1887.

MINUTE OF THE COLLEGE MEETING.

PHILADELPHIA, June 27, 1887.

The regular meeting of the members of the College was held this day in the hall, Mr. Robert Shoemaker presiding—fifteen members being present. The minute of the last stated meeting was read and adopted. The minutes of the Board of Trustees for April, May and June were read, and, on motion, approved.

Mr. W. J. Jenks, chairman of the committee appointed to receive and prepare for the entertainment of the members of the Pennsylvania State Pharmaceutical Association, submitted a brief written report, which condensed, represents as follows: "That the programme was fully and successfully carried out in every detail. The evening reception tendered by the members of this College to the visiting members of the State Association, having in addition to its pleasing social features, the instructive aid of an exhibition of the power of the microscope, and illustrations of subjects and objects by the lantern. A vote of appreciation was passed by the State body as acknowledgement of the hospitalities and courtesies extended by the College. The occasion gave opportunity to many to inspect the thoroughly ample educational facilities of the College, and its valuable museum of specimens."

In the absence of the chairman of the committee to represent this College at the recent meeting of the State Association, Mr. Alonzo Robbins gave a verbal report, having reference mainly to the business procedure of the sessions, which continued through three days, and with more than an average attendance, evinced interest in the work of the State body. Numerous papers assigned, and volunteer, were presented, and the accessions to membership were considerably more than one hundred.

The chairman called attention to the recent death of two members of the College, that of William Biddle elected in 1826, who died June 7th in the eighty-second year of his age, thus severing a long and esteemed connection, and closing a most exemplary life; and also that of J. Willits Worthington, which occurred at Moorestown, N. J., June 9th. Mr. W. was made a member of the College in 1872. On motion, the record of these deaths was referred to the appropriate committee.

Prof. Maisch announced the death of an honorary member of the College, Prof. Wittstein, of Munich. A succinct account of the notable periods of his life was given verbally; his eminent and close connection with the advancement of chemical science and research. Prof. Wittstein entered upon the

pharmaceutical study at an early age, beginning his subsequently distinguished career at the lower-most round of fame's ladder.

Mr. Gustavus Pile, of the committee on deceased members, read a prepared memoir of the late W. C. Bakes, which it was explained, had been unavoidably delayed in its presentation by causes beyond control.

Mr. William C. Bakes, who for a number of years was actively connected with this college, died at his residence at Ocean Grove, N. J., August 29th, 1886. Mr. Bakes was born at Liskard, England, January 2d, 1837, and when a mere lad was brought to this country. His father died on the passage over and was buried at sea. He began his career in the drug business as an errand boy in the store of Elias Durand at the S. W. corner of 6th and Chestnut streets, and afterwards became an apprentice to that well known druggist from whom he received much valuable information and careful training. He attended the Philadelphia College of Pharmacy and graduated in 1855.

After graduating he left Mr. Durand and entered into partnership with Mr. DeHaven under the firm name of Bakes & DeHaven. They bought the store at the S. W. corner of 7th and Buttonwood streets from Mr. S. W. Caldwell, and began business, but Mr. DeHaven having no knowledge of the drug business, became dissatisfied and soon retired, withdrawing his capital. In consequence of this Mr. Bakes was unable to retain the place, and he took a position in the store of Prof. Edw. Parrish at the S. W. corner of 8th and Arch streets, where by his attention and ability he rose to the position of head clerk and manager of that well known establishment. About the year 1870 he began business for himself at the S. W. corner of 11th and Arch streets, where he remained for several years. After the death of Mr. Thomas Lancaster, the proprietor of the store at the N. E. corner of 10th and Arch streets, Mr. Bakes removed from 11th street to that place and there continued business. About this time Mr. Bakes opened a store at Ocean Grove, a seaside resort that was then beginning to attract considerable attention, and this venture proving quite successful he abandoned his store in this city and devoted himself entirely to this new place. His business grew with the place and he soon had the satisfaction of seeing the results of his labor in the establishment of a flourishing and profitable drug store, which he continued to enjoy to the time of his decease.

He was one of the founders of the Asbury Park Library Association, and through his efforts the gift to the association of the fine Grant Memorial Window, from Mr. Geo. W. Childs was secured, as well as large donations of money and books from other sources. Mr. Bakes was for many years an active and zealous member of this college, and during that time he won the friendship and good will of all those with whom he was associated. He bestowed a great deal of time and labor for the promotion of the best interests of the institution, and of the whole profession of pharmacy at large.

He contributed from time to time a number of interesting and valuable papers to the *AMERICAN JOURNAL OF PHARMACY*, and was foremost in the ranks of those who advocated the advancement of knowledge among those

engaged in the practice of pharmacy. Mr. Bakes was elected as secretary of the Board of Trustees on April 4th, 1872, which position he faithfully filled till the time of his last illness, always receiving the warmest regard from all the members of the board. The Pharmaceutical Examining Board was established by law in 1872, and Mayor Stokley appointed Mr. Bakes as one of its members, which position he held for several years.

Mr. Bakes was an influential member of the Trinity Methodist Episcopal Church before its removal from the old edifice, on 5th street near Race, and was also active in the work of the Methodist Historical Society, and other branches of church work. He left a widow and two young sons to mourn his death.

The following gentlemen were nominated, and by viva voce vote elected delegates to attend the meeting of the American Pharmaceutical Association, to be held in Cincinnati, September next: Henry Trimble, Alonzo Robbins, William B. Webb, Wm. J. Jenks, Gustavus Pile, and as alternates, Geo. W. Kennedy, Wm. McIntyre.

In answer to an inquiry it was stated that the Governor of the State had made the appointment of five gentlemen to constitute the Pharmaceutical Examining Board, under the new Pharmacy act. The names of the gentlemen are as follows: Mr. A. B. Burns, H. A. Tafel, H. B. Cochran, F. H. Eggers, and Alonzo Robbins. The terms are consecutively as named for periods of one, two, three, four and five years.

There were some opinions expressed in regard to the operations of the High License Law of the State of Pennsylvania upon the business of the Pharmacists.

On motion the meeting now adjourned.

WILLIAM B. THOMPSON, Secretary.

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

The Alabama Pharmaceutical Association held its sixth annual meeting at Mobile, May 10th and 11th. Besides routine business, and discussions on various practical subjects, the operation of the pharmacy law claimed much of the attention of the meeting. The number of registered pharmacists in the State was reported to be 215. The newly elected officers are J. B. Collier, president; A. Godden and J. W. Holland, vice-presidents; P. C. Candius, secretary; and E. P. Galt, treasurer. The next annual meeting will be held at Selma.

The Arkansas State Pharmaceutical Association met in Little Rock, June 1-3. Besides the address of President Bond and the reports of officers and committees, several papers were read, and various subjects of practical interest were discussed, like disguising the bitter taste of quinine, the use of petrolatum in ointments, covering the odor of iodoform, &c. A lengthy discussion on pharmaceutical legislation was had, and the co-operation of the State Medical Society was asked for the purpose of securing a pharmacy law. W. W. Kerr, Batesville, was elected president; J. E. Gibson, Little

Rock, vice-president; J. M. Beidelman, Little Rock, secretary, and E. P. Schaer, Little Rock, treasurer. Hereafter the annual meeting will be held at the time and place of the meeting of the State Medical Society.

The Delaware State Pharmaceutical Association, at a meeting held in Wilmington, May 12th, elected the following officers: H. R. Bringham, Wilmington, president; J. G. Bragdon, Middleton, D. J. Burton, Dover, and G. E. Smith, Canvel, vice-presidents; and John M. Harvey, secretary and treasurer. The annual meetings will be held on the first Thursday in May. The place for the next meeting will be announced after further consultation.

The Florida State Pharmaceutical Association was organized at Jacksonville June 8. The first session was held in the hall of the Board of Trade, Henry Robinson presiding. After the organization had been agreed to, and a number of committees appointed, the members went in the afternoon on an excursion by rail to Pablo Beach, and on the following morning proceeded in the steamer, "Seth Low," to the coral banks in the Atlantic Ocean, a session being held on the downtrip. The Constitution and By-laws reported by a committee, were considered and adopted, after which the following officers were chosen: President, Dr. Henry Robinson, Jacksonville; Vice-presidents, W. A. Rawls, Tallahassee, Ed. Delouest, Ocala, and H. C. Cushman, Pensacola; Secretary, Jas. A. Conover, Jacksonville; Treasurer, John M. Dixon, Titusville. A number of standing committees were elected, and delegations to various associations were appointed. The first annual meeting of the association will be held in Tallahassee on the second Tuesday of May, 1888.

The Indiana Pharmaceutical Association met June 7 and 8 at its sixth annual meeting in Richmond, President Leo Eliel in the chair. The president's address, the reports of officers and committees, the reading of a number of practical papers, and the pending pharmacy law formed the chief subjects of discussion. The newly elected officers are Dr. W. C. Bryant, Frankford, president; J. K. Lilly, A. G. Luken and F. Gesser, vice-presidents; J. R. Perry, Indianapolis, secretary, and W. H. Ross, Richmond, treasurer. The next meeting will take place at Fort Wayne.

The Iowa State Pharmaceutical Association was in session May 11 and 12, at its eighth annual meeting in Waterloo. The president's address, and reports of officers and committees were read and fully discussed, much time being occupied with the discussion on the liquor laws of that State and their effect upon legitimate pharmacy. Prof. Boerner read a paper on the cost of preparations made by the pharmacist; H. Tiarks one on *ointment of zinc oxide*, recommending the use of commercial zinc white; J. H. Atkinson, one on the deficiency of strength claimed for certain elixirs of berberine. The officers elected are: W. C. Bryant, Cedar Falls, president; Jer. Burbank, Denison, I. James, La Porte, and F. W. Brinkhoff, Pella, vice-presidents; Dr. Rosa Upson, Marshalltown, secretary; and C. H. Ward, Des Moines, treasurer. The association adjourned to meet again in Des Moines May 2, 1888; Norman Lichty, local secretary.

The *Kansas Pharmaceutical Association* met at its eighth annual meeting at Wichita, June 8th and 9th, and listened to the address of President Sears, and to the reports of various officers and committees. Several papers were read, nominations for the State board of pharmacy were made, and the following officers were elected: R. S. Drake, Beloit, president; C. Lawrence Wichita, and A. Totten, Osage City, vice-presidents; J. T. Moore, Lawrence, secretary, and C. D. Barnes, Abilene, treasurer. The next meeting will be held at Abilene, May 17, 1888; E. E. Lewis, local secretary.

The *Kentucky Pharmaceutical Association* held its tenth annual meeting in Louisville, May 18th, President J. W. Fowler in the chair. Besides the president's address, and the reports of officers and committees, a number of papers, practical, statistical and ethical were read and discussed. By a communication from State Auditor Hewitt, the Association was informed that, "under the present law, a druggist can not sell whisky in quantities less than five gallons, for any purpose, without a license; that the officers had been instructed not to enforce the laws rigidly on druggists selling on prescriptions alone; but that they were liable to indictment at any time, unless they procured a license." A large committee was appointed to urge upon the legislature various amendments relating to the practice of pharmacy. The officers elected for the ensuing year are J. W. Fowler, Louisville, president; W. Turner, Bowling Green, W. S. Johnson, Henderson, and G. W. Fitzgerald, Georgetown, vice-presidents; W. B. McRoberts, Stanford, secretary; J. J. Brooks, Richmond, treasurer, and E. Y. Johnson, Louisville, corresponding secretary. The next annual meeting will be held in Henderson on the second Wednesday, May 9, 1888.

The *Massachusetts State Pharmaceutical Association* held the sixth annual meeting in Holyoke, June 7-9. An address of welcome by the mayor, Dr. O'Connor opened the sessions, at which President Canning's annual address, and the reports of secretary, treasurer, and of the various committees were read. Several papers were presented and discussed, and discussions were had on various practical subjects. The officers elected are J. H. Manning, Pittsfield, president; B. F. Stacey, Charlestown, C. E. Bardwell, Holyoke, and J. A. Rice, Milford, vice-presidents; J. W. Colcord, Lynn, secretary, and T. B. Nichols, Salem, treasurer. A special meeting will be held in Boston in January next, when the time and place of the next annual meeting will be decided upon.

Visits to various factories and an excursion to Mount Nonotuck were made by the members on this occasion.

The *Minnesota Pharmaceutical Association* met in New Ulm June, 14 and 15, President J. R. Jones in the chair. The address of the president, and the reports of the secretary, treasurer and of the various committees were received, discussed and acted upon, and nominations were made for filling the next vacancy in the pharmacy board. Several papers were read. The new officers are J. P. Allen, St. Paul, president; E. F. Allen, Minneapolis, secretary, and S. E. McMaster, St. Paul, treasurer. The next meeting will take place at Stillwater, June 12, 1888. J. C. Henning, local secretary.

The Mississippi State Pharmaceutical Association convened at its fourth annual meeting in the Senate Chamber in Jackson, May 17. Besides receiving and discussing the usual reports of officers the interest centered in the discussion on the proposed pharmacy law, and on the endeavors to secure for it the support of the members of the legislature, a committee consisting of one member from each county being appointed for this purpose. The officers elected for the ensuing year are: Byron Temly, president; D. E. Holt, vice-president; H. F. West, secretary, and J. B. Dudley, treasurer. The next meeting will take place at Meridian, May 15, 1888.

The New Jersey Pharmaceutical Association met at Paterson, May 18th and adjourned to May 25th for holding its seventeenth annual meeting. President Kilmer read his annual address making a number of recommendations which were favorably reported upon by a committee and then approved by the association. The Pharmacy Board gave an account of the work during the past year and paid over to the association \$162 received in excess of the expenditures. The total number of registered pharmacists in New Jersey is 1380, of whom 129 had been added during the year, 83 being graduates in pharmacy; of those examined by the Board only 36 per cent. succeeded in passing. A number of interesting papers were read, among them, two by Aug. Drescher urging pharmacists to qualify as analysts with the view of not only determining the purity and quality of medicines prepared and dispensed by them, but also for undertaking the examination of food and for toxicological analysis. Other papers treated of botanical subjects, the preparation of galenicals, &c. A series of resolutions were adopted urging the restriction of the sale of liquors by pharmacists to their use as medicinal agents, and in the case of alcohol to its use in chemical, mechanical and household arts.

The new officers are G. S. Cook, Somerville, president; G. H. White, Jersey City, and R. J. Shaw, Plainfield, vice-presidents; F. B. Kilmer, New Brunswick, secretary, and Wm. Rust, New Brunswick, treasurer. The next meeting will be held in Morristown, May 23, 1888.

During the meeting the falls of the Passaic and a number of the industrial establishments of Paterson were visited by the members.

The Ohio State Pharmaceutical Association held its ninth annual meeting in the Council Chamber, in Akron, June 8th and 9th, President Coblenz in the chair. The annual address of the president and the reports of the secretary, treasurer, the various committees and of the State board of pharmacy claimed the attention of the meeting. During the past year the State Board examined 225 and passed 102 (48 per cent.) as pharmacists; also examined 136 and passed 48 (35½ per cent.) as assistants.

Amendments to the by-laws were proposed, creating a committee on adulterations, and making members life members on the payment of \$10. The following officers were elected: S. E. Allen, Akron, president; M. D. Fulton, Bucyrus, and G. W. Voss, Cincinnati, vice-presidents; L. C. Hopp, secretary, and Chas. Huston, treasurer. The next meeting will be held in Columbus on the second Tuesday (13th) of June, 1888; H. C. Cook, local

secretary. Nominations were also made for the pharmacy board. Among the papers read the following are mentioned :

Sulphate of morphine, by P. I. Spenzer, treating of the quality of the commercial salt.

Black oxide of manganese, by S. W. McKeown. The commercial oxide was found free from adulteration.

Pressed herbs, by Jos. Feil. The quality is generally good, and in some cases better than that of commercial loose herbs.

The handwriting on the wall, by Prof. J. U. Lloyd. The writer thought it was useless to try to block the wheels of progress and stick to old ideas of pharmacy ; it was no use to rebel against the innovations of new ways of carrying on the trade and no one ever did so but to find himself suddenly isolated from the modern druggists.

Solution of ferric citrate, the quality of commercial powdered opium, and the amount of resin in commercial jalap and powdered jalap, formed the subjects of other papers.

The Pennsylvania Pharmaceutical Association assembled at its tenth annual meeting in the museum of the Philadelphia College of Pharmacy, June 14-16, President Jas. A. Meyers in the chair. The Director of Public Works, General L. Wagner, representing Mayor Fidler, extended a welcome to the association on behalf of the citizens. Vice-president Wm. J. Jenks extended the hospitalities of the College, and Dr. A. W. Miller those of the Drug Exchange. The President's address referred to the pharmaceutical literature of the past year, and spoke of the pharmacy law recently passed by the legislature, and of the high license law with its effects upon those druggists who have made the sale of intoxicants a prominent feature of their business. In discussing the affairs of the association, various suggestions were made which were referred to a committee, and subsequently reported back, somewhat modified, and adopted. Owing to various large expenditures during the year, the treasurer's balance amounted only to \$38.74. The membership of the association was reported to be 506, besides 6 honorary and 19 associate members. During the meeting 122 new members were elected.

The report of the Committee on Legislation created considerable discussion on the new pharmacy law, which totally ignores pharmaceutical education ; section 11 was more particularly criticized, and the sentiment of the Association was expressed in the adoption of the following resolution offered by Mr. C. T. George :

Resolved, That it is the sentiment of the association that Section 11, of the Pharmacy law, is not in the interest of pharmaceutical education, and that, inasmuch as physicians have neither the training nor education of pharmacists, they should not be permitted to practice pharmacy without having passed a satisfactory examination before the State Board of Pharmacy, and that the repeal of Section 11 be referred to the Committee on Legislation, with instructions to have the same repealed as soon as possible.

The Committee on County Societies reported the formation of four new societies during the year, making thirteen in all. The Committee on Adulterations reported on the observations communicated to them, and without

suggesting some definite course, urged the adoption of measures for preventing the adulteration of drugs and of food. In connection with this subject Prof. Maisch exhibited a specimen of *false serpentaria*, samples of which he had repeatedly received from different parts of the country during the past ten years, without being able to trace it to its source, until about a year ago Prof. Coblenz, of Springfield, Ohio, succeeded in procuring the plant which proved to be *Polemonium reptans*; in size and shape it resembles *serpentaria*, but is easily distinguished from this by the white color.

Acting upon a suggestion in the President's address, the Association directed the appointment of a committee of five to visit the Pennsylvania Medical Society at its meeting in Bedford Springs, June 29, and present resolutions, soliciting the aid and co-operation of that association in promoting the prescribing by physicians of officinal medicines only, or of preparations the working formula of which is known; also inviting the Medical Society to send delegates to the meetings of the Pharmaceutical Association.

The officers elected for the ensuing year are: President, William L. Turner, of Philadelphia; Vice-presidents, William Harris, of Hamburg, John W. Miller, of Allegheny; Treasurer, J. L. Lemberger, of Lebanon; Secretary, Jacob A. Miller, of Harrisburg. Charles D. Lippincott was elected assistant secretary, and the Association finally adjourned to meet next year in Titusville, Crawford Co., on the second Tuesday of May.

Three of the papers read during the sessions we are enabled, through the courtesy of the authors, to publish in the present number. Several papers were of a statistical nature, or treated of general subjects not capable of being presented in a condensed form: but of the following we give brief abstracts:

Hydrometer scales, by Gust. Pile.—While the principles are well known upon which hydrometers are constructed, the manner, in which the scales attached thereto are ruled, is not generally known. In cases where the divisions are uniform, a determination of two points and sub-division of the space into the requisite number of parts may be made; but those scales requiring marks which are not equidistant, must be prepared in a different manner. Charts are prepared for each kind, the sub-divisions being carefully determined by experiment and calculation for different lengths of the entire scale, and then united by straight lines which obviously diverge uniformly from the shortest to the longest scale. Three or four or a larger number of points are then determined upon the new instrument, and by sliding this trial scale along the chart until the different points, thus determined, coincide with the proper degrees on the standard chart, the remaining sub-divisions are readily indicated.

Water, its uses and abuses in Pharmacy, by J. L. Lemberger.—For all medicinal preparations the use of *distilled* water is urged in preference to water from other sources. The abuses of water in pharmacy are found in its unwarranted use for diluting a menstruum or a medicinal liquid.

Linimentum ammoniac, by Prof. J. P. Remington.—The U. S. P. formula, which directs cottonseed oil, yields a liniment, which readily separates into

two layers; the addition of a little alcohol will materially lessen, but not entirely prevent the separation. Commercial olive oil which was formerly directed, consists now mainly of cottonseed oil mixed with some olive oil, and, therefore, cannot be recommended for this preparation. A creamy white homogeneous liniment, which does not change in several weeks, is obtained by using ammonia water, 30 parts, and lard oil, 70 parts.

Medicated plasters with rubber, by Dr. J. J. Edmondson.—The addition of solutions of caoutchouc to plaster masses does not improve their adhesive qualities. A good stock plaster suitable for most purposes is obtained from Burgundy pitch and olibanum, of each 1 part, and prepared caoutchouc 2 parts. For obtaining the latter the crude rubber of the market is steeped in hot water, crushed between corrugated rollers, washed with water, dried and softened by pressing it between smooth rollers, when the other ingredients mentioned may be incorporated with it, which operation likewise requires the use of heavy machinery. This rubber stock is regarded as superior to lead plaster as a base, and may be mechanically mixed, by means of iron rollers, with resins, extracts, etc. The spreading of these plasters is likewise best done with the aid of rollers.

Commercial castile soap, by Prof. Remington.—Four brands of white and one of mottled castile soap were examined; no insoluble substances worth noting were found, the latter variety, however, containing the largest percentage. The moisture varied between 15.6 and 22.9 per cent., the average being 18.01 per cent.

Commercial lupulin, by John H. Hahn.—The amount of ash found in eight samples was 5.0, 6.0, 14.12, 16.24, 19.34, 22.17, 23.40 and 25.33 per cent. Two samples only come within the pharmacopœial requirement of yielding not over 8 per cent. of ash, the impurity in the other samples being sand.

Conium fruit in Italian anise, by C. L. Lochman.—During the past eight years Italian anise was repeatedly sowed, and invariably yielded, in part, a crop of *Conium maculatum*, apparently equivalent to between two and five per cent. of the commercial article.

The author had sent some of the conium plants thus obtained, which were in bloom, with the fruit partly developed. German anise had never yielded conium plants when planted by the author, who naturally concluded that *all* Italian anise is more or less contaminated with conium fruit. To test this conclusion Dr. C. B. Lowe procured from two wholesale houses samples of Italian anise in stock, and from both small quantities of conium could be picked out on careful examination.

Peppermint industry, by Dr. W. M. Weills.—The paper gives an account of the cultivation of the peppermint plant in the United States and the production of the volatile oil and of menthol.

The ladies and many of the visiting members made excursions up the Schuylkill and to Fairmount Park, and visited the Zoological Garden, Girard College, the German Hospital, and other public institutions and buildings. On Wednesday evening, June 15, the Philadelphia College of Pharmacy tendered a reception to the visitors, the entire building being opened for their inspection; in one of the rooms a microscopic exhibition had been

prepared by Mr. A. P. Brown, assisted by his pupils of the alumni microscopical class, and in one of the lecture rooms the members of the faculty gave a varied exhibition by means of the oxy-hydrogen lantern, while in the museum refreshments and music had been provided for the party. After the adjournment, on Friday, the druggists and allied trades of Philadelphia tendered a steamboat excursion to the visitors, about 500 persons participating. The steamer Columbia left Chestnut street wharf and proceeded down the Delaware to the mouth of the Schuylkill and up the river to Bristol. Music was furnished for the occasion by Beck's Band.

The Texas State Pharmaceutical Association convened at its eighth annual meeting in Fort Worth May 10th-12th. In the absence of the presiding officers, Mr. E. D. Oesch was elected president *pro tem*. The president's address and reports of officers and committees were read and discussed, and several papers on various pharmaceutical subjects were contributed. The pharmacy bill and the causes of its repeated failure in the legislature were fully discussed, and a committee was appointed to bring the measure again before the legislature and urge its passage. The officers elected for the ensuing year are E. M. Wells, Fort Worth, president; F. J. G. Zethræus, Paris, H. L. Carlton, Brenham, and N. M. McConnell, Jacksboro, vice-presidents; E. W. Lancaster, Marshall, treasurer; E. D. Oesch, Fort Worth, secretary; and O. Samostz, Austin, local secretary. The next meeting will be held in the city of Austin, May 8, 1888.

The Virginia State Pharmaceutical Association convened at its sixth annual meeting in Richmond, May 10th to 12th. The president's address and the reports of officers and committees were received and discussed. A committee was appointed for the purpose of conferring with a similar committee of the Virginia Medical Association in regard to the mutual relations between pharmacists and physicians. After a lengthy discussion on the pharmacy law it was decided to petition the legislature to so modify the law as to separate the creation of the pharmacy board from the act of incorporation of the Association. The newly-elected officers are Rob. Brydon, Danville, president; E. R. Beckwith, J. H. Jeffries, W. Budwell, and J. H. Waite, vice-presidents; F. H. Masi, treasurer; C. B. Fleet, Lynchburg, secretary, and T. Roberts Baker, corresponding secretary. The next meeting will be held at Danville, May 1st, 1888.

The West Virginia Pharmaceutical Association convened at its seventh annual meeting in the court house at Grafton June 8, President J. A. Grant in the chair. Words of welcome were spoken by Hon. B. F. Martin. The president delivered his address, and the secretary, treasurer and the different committees made their reports. Resolutions were passed favoring the enactment of a more stringent pharmacy law; requesting the present vacancies in the pharmacy board to be filled, and urging the assessment of a tax of \$10 on all persons dealing in medicines and not registered as pharmacists. The officers elected for the ensuing year are W. C. McWhorter, Buckhannon, president; J. Morrow, Weston, vice-president, and C. Menke-

mieller, Wheeling, secretary and treasurer. The next meeting will be held at Clarksburg June 19, 1888.

The *Tennessee Pharmaceutical Association* held its second meeting in Nashville May 11. The address of President Gordon, the reports of the different officers and committees, and discussions on legislation and other subjects occupied the attention of the members. R. A. Sloan, Chattanooga, was elected president; D. L. Goodyear, Memphis, and J. A. McCampbell, Knoxville, vice-presidents; J. L. Thompson, Nashville, secretary, and E. L. Laurent, Nashville, treasurer.

EDITORIAL DEPARTMENT.

Pharmaceutical Legislation in Pennsylvania.—In another place we print the full text of the new pharmacy law, from a copy that had been obtained from the office of the Secretary of State. By referring to section 11 and comparing the same with our remarks on page 317 of the June number, it will be observed that registered practitioners of medicine are permitted to be registered as pharmacists after three years continuous practice—not practice in pharmacy as we had supposed—and, consequently that objectionable section does not contain even the mitigating feature we supposed it did, and which alone could give an apparent justification for the admission of the section. The action of the Pennsylvania Pharmaceutical Association, demanding its repeal, is proper and just, and should be complied with by the Legislature at its earliest opportunity, in the interest of the public, of medicine and of pharmacy alike.

The appointments for the Pharmaceutical Examining Board have been made by Governor Beaver, as follows: Alonzo Robbins of Philadelphia, for five years; Frederick H. Eggers, of Allegheny City, for 4 years; Harry B. Cochran, of Lancaster, for 3 years; H. A. Tafel, of Philadelphia, for 2 years, and A. B. Burns, of Susquehannah County, for 1 year. The three first named gentlemen are members of the Pennsylvania Pharmaceutical Association, and are fairly representative pharmacists of the State. We learn that Mr. Burns is a man of considerable pharmaceutical experience since the civil war, in which he is stated to have served as hospital steward. Mr. Tafel is a member of the firm of Boericke & Tafel, homœopathic pharmacists; it is possible that his appointment may be due to the fact that a homœopathic pharmacy bill had been passed by the Legislature, but was vetoed by the Governor in view of the enactment of the general pharmacy law, which makes no distinction between different pharmaceutical systems or creeds.

In connection with pharmaceutical legislation in Pennsylvania, it is proper to record also the clause relating to druggists and apothecaries, in the high license law enacted by the Legislature and approved by the Governor. This clause is more liberal and just than analogous laws in some other States, and while a certain ambiguity is noticeable, we think that a fair construction of the provisions concedes to the public every reasonable demand upon the apothecary for the supply of medicines and alcohol, but

forbids the sale of non-medicated liquors except upon a physician's written order. The section is as follows :

SECTION 17. That druggists and apothecaries shall not be required to obtain a license under the provisions of this act, but they shall not sell intoxicating liquors except upon the written prescription of a regularly registered physician; alcohol, however, or any preparation containing the same, may be sold for scientific, mechanical, or medicinal purposes. Any one violating the provisions of this act shall be guilty of a misdemeanor, and upon conviction thereof shall be subject to the same penalties as are provided in the 15th section of this act; provided that no spirituous, vinous, malt or brewed liquors shall be sold or furnished to any person more than once on any one prescription of a physician; and provided further that any physician who shall wilfully prescribe any intoxicating liquors as a beverage to persons of known intemperate habits, shall be guilty of a misdemeanor and upon conviction thereof shall be subject to the same penalties and fines as are prescribed in section 15.

Correction.—June number p. 305, line 19 top, for .858 read .853.

p. 311, " 2 " +4 " +44.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Handbuch der praktischen Pharmacie für Apotheker, Drogisten, Aerzte und Medicinal-Beamte. Von Dr. Heinrich Beckurts, Professor an der herzogl. & technischen Hochschule in Braunschweig, und Dr. Bruno Hirsch, Apotheker in Frankfurt am Main. Stuttgart: Ferdinand Enke, 1887. 1 und 2 Lieferung. 8vo.

Hand book of practical pharmacy for apothecaries, druggists, physicians and medical officers. By Prof. Dr. H. Beckurts and Dr. Bruno Hirsch, apothecary. Fascicles 1 and 2; each 96 pages. Price 2 marks each.

The object of this work is the presentation in a clear and logical manner of the requirements of the modern pharmacist who aims at thorough information in all branches of his profession. Starting with an exposition of the scope of modern pharmacy, the authors find its main obligation in the acquisition of accurate knowledge concerning all medicinal substances according to composition, properties, chemical and physical behavior, examination and valuation, in addition to the rational preparation of the medicaments. While the ideal of modern pharmacy, as far as the galenical preparations are concerned, is the exact determination of the active principles, in most cases reliable and exact methods for such valuations are still unknown; and the pharmacist is therefore in duty bound to prepare himself, from drugs of undoubted quality, powders, extracts, tinctures and such other medicaments, for which the control by means of chemical and microscopical examination is still uncertain. A wide field is open for scientific pharmacy in the anatomical examination of drugs, the elaboration of methods for exact valuation, the determination of causes of deterioration, and in researches on the proper preservation of the various medicaments; obviously the technical operations must not be neglected, such as improvements in apparatus, manipulation, dispensing, and in the conversion of medicinal substances into agreeable and therapeutically active forms. Forensic chemistry and public hygiene are likewise fields which naturally fall within the scope of the thoroughly educated pharmacist.

The book opens with the arrangements of the pharmacy for business purposes: the officine, laboratory, store room, &c. The various pharmaceutical, chemical and physical operations are next considered and fully described in all their bearings, illustrated by many excellent wood cuts, and containing numerous practical hints and observations based on the extended practical experience of the authors.

The two fascicles now before us constitute about the seventh part of the entire work, the publication of which will be completed in the course of a year, and give promise that the work will be thoroughly accomplished, comprehensive in scope, convenient in arrangement, precise and clear in diction, and reliable and instructive in detail, thus deserving a prominent place in the pharmaceutical library.

A Compend of Pharmacy. By F. E. Stewart, M. D., Ph. G., &c. Second edition, thoroughly revised. Philadelphia: P. Blakiston, Son & Co., 1887. 12 mo. pp. 184. Price \$1.

The first edition of this little work was noticed in our June number last year. In preparing the second edition, it has been revised, and in our opinion, considerably improved. Its value as a note-book by students, we think, would be enhanced by interleaving for the purpose of making additions.

Elements of Botany, including organography, vegetable histology, vegetable physiology, and vegetable taxonomy; and a glossary of botanical terms. Illustrated by nearly 500 engravings from drawings by the author. By Edson S. Bastin, A. M., F. R. M. S., Professor of Botany, Materia Medica and Microscopy in the Chicago College of Pharmacy. Chicago: G. P. Engelhard & Co., 1887. 8 vo. pp. 282. Price \$2.50.

In writing this book Prof. Bastin has supplied a want which we have long felt—a book which may be put into the hands of the student, without causing undue bewilderment, and which would contain the essential facts ascertained in the vast domain of botany, without branching off into variations and details that would become confusing to the beginner, though of importance to the naturalist.

The arrangement of the various branches is indicated in the title; the descriptions and explanations are, as a rule, full and exact, and devoid of tediousness, rarely vague. The plants chosen as examples are characteristic and mostly readily obtainable, and the numerous cuts will serve the purpose for which they have been designed. The book deserves to be put into the hands of the student, and if intelligently used by him, will prove a very valuable aid.

That the publishers have made the book inviting by the employment of clear types, good paper and attractive binding is an additional recommendation.

Lectures on Botany and Materia Medica, and on Chemistry. By C. S. Hallberg, Ph. G., Chicago. 4o. Pp. 196.

This publication is designed to furnish those preparing for the examinations before pharmaceutical boards with a synopsis of the sciences named

as applied to pharmacy. It is intended to be sent out every two or four weeks in parts sufficient to be studied in that space of time, thus securing a systematic reading. While any other good work on the same subjects could be used equally well, the advantage is connected with the one before us, that the student is expected to communicate with the author on all points not fully comprehended, and in return receive further explanations; moreover the student is examined—by correspondence—on the subjects previously read, by which means deficiency may be pointed out.

This system of teaching has been previously tried in other departments, and may be considered as a suitable aid where oral instruction cannot be had. To be profitable to the student, it presupposes familiarity with the outlines of the sciences, or at least a well trained mind capable of assimilating knowledge, and not merely accustomed to crowding the memory with isolated facts; such students, after perusing the lectures, will find an additional incentive for seeking further instructions in a good educational institution.

The Physician's Dose and Symptom Book, containing the doses and uses of all the principal articles of the *materia medica* and officinal preparations, arranged in alphabetical order; also tables of weights and measures, rules to proportion the doses of medicine, common abbreviations used in writing prescriptions, alphabetical list of *materia medica*, preparations and mode of administration, list of incompatibles, hints on prescription writing, table of poisons and antidotes, hints on treatment and table of symptoms. By Jos. H. Wythe, M. D., Prof. of histology and microscopy, Cooper Medical College, San Francisco, &c. Seventeenth edition, completely rewritten and enlarged. Philadelphia: P. Blakiston, Son & Co., 1887. 32 mo. pp. 226. Price, cloth \$1.

That this little book has been found useful may be judged from the fact that it has passed through so many editions. The present one has been rewritten to a considerable extent, and on the whole will be found reliable. The non-pharmacopœial articles are marked with an asterisk (*) in the *materia medica* list, but not in the list of preparations, and since the book is intended to cover both the British and United States Pharmacopœias, the figures given for the preparations should be accompanied by the authority in all cases where the difference in strength is notable. Under the head of infusions for instance are found formulas of the present and preceding U. S. and Br. pharmacopœias, the infusion of *digitalis* being that of Br. 1867 and the much stronger preparation of the U. S. P. is not indicated. In the *materia medica* list the names of the different articles are usually in Latin, but inconsistencies are met with like the following: ammoniated iron, *ferum dialysatum*, arseniate of ammonium, *sodii arsenias*, &c. A number of typographical errors in spelling and accentuation have been overlooked by the proofreader.

The doses have been stated with great care, and with the useful information collected together in the various tables in a very compact form, insure the utility of the little volume to physicians as a handy work of reference on those points.

Public Health. The Lomb Prize Essays, award made at the thirteenth annual meeting of the American Public Health Association, Washington, D. C., December 10, 1885, with an appendix. Second edition, Concord F. H., 1886. 8 vo. pp. 198.

We acknowledge the receipt of this handsome and instructive volume, which contains the following four essays:

I. Healthy Homes and Foods for the Working Classes; by Prof. Victor C. Vaughan, of Ann Arbor.

II. Sanitary Conditions and Necessities of School Houses and School Life; by Dr. D. F. Lincoln, of Boston.

III. Disinfection and Individual Prophylaxis against Infectious Diseases; by Dr. G. M. Sternberg, Surgeon U. S. A.

IV. Preventable Causes of Disease, Injury and Death in American Manufactories and Workshops; by Geo. H. Ireland, of Springfield, Mass.

These interesting and important essays should become widely known, and we are pleased to learn that the Association is enabled to furnish them to those interested at the cost of printing and postage, viz.: single essays, 10 cents; any two of them, 15 cents; the four bound in cloth, 65 cents, and the same printed on extra heavy paper and well bound, \$1. They may be procured from the Secretary, Dr. Irving A. Watson, Concord, N. H.

Report of the Committee on Disinfectants, presented at the fourteenth annual meeting of the American Public Health Association, held at Toronto, Canada, October 5-8, 1886. Concord, N. H. 8vo. pp. 33.

A reprint from vol. xii of the Transactions of the above-named association. The report describes a number of apparatus which have been designed for disinfecting purposes, the construction and application being illustrated by 37 cuts.

Foods and Food Adulterants. Part I. Dairy Products, Washington: Government Printing Office. 1887. 8vo. pp. 132.

This is bulletin 13 of the Division of Chemistry, U. S. Department of Agriculture. It treats of butter, milk, cheese, and similar products, their qualities, deterioration, adulteration and fraudulent substitution, and enters fully into the various methods proposed for their analysis; it contains twelve plates prepared from photographs taken with the aid of the microscope, and illustrating the appearance under various conditions of butter and different fats.

New Treatment of the Affections of the Respiratory Organs and of Blood Poisoning by Rectal Injections of Gases, after the Method of Dr. Bergeon. By Dr. V. Morel. Translated from the French by L. E. Holman. Philadelphia: J. W. Queen & Co. 8 vo. pp. 21. Price, 25 cents.

Twenty-sixth Annual Report of the Board of Managers of the Woman's Hospital of Philadelphia. 1887, pp. 38.

Seventieth Annual Report of the state of the Asylum for the Relief of Persons Deprived of the Use of their Reason. Philadelphia, 1887. pp. 28.

Untersuchungen über die Darstellung und Eigenschaften des Inosit, sowie über dessen Verbreitung im Pflanzenreiche. Von Richard Fick.

Researches on the preparation and properties of inosit, and the distribution of the same in the vegetable kingdom. (Dorpat Dissertation.)

The author showed the presence of inosit in a large number of plants; it exists, however, always in such minute proportion that it cannot be a prominent factor in vegetable physiology. Climbing plants like *aristolochia*, *ampelopsis*, *humulus*, *vitis*, *pisum* and *phaseolus*, contained considerably more inosit than the other plants examined.

Der Kohlensäure-Gehalt der Luft in Dorpat bestimmt in den Monaten Februar bis Mai, 1887. Von Victor Feldt.

The amount of carbonic acid of the air in Dorpat, determined during the months of February to May, 1887. (Dorpat Dissertation.)

The large number of determinations seem to indicate that, with the wind from west and southwest, the air contains a smaller amount of carbonic acid, while the largest amount was found with the direction of the wind from the northeast.

Des Poisons de Flèches et d'Épreuve en général, et de l'inée en particulier. Par Gaston Fontaine, pharmacien de 1. classe.

On arrow poisons and ordeal poisons in general, and on inée (*strophanthus*) in particular. (Thèse, Montpellier.)

We hope to give a condensed account of this thesis in a subsequent number.

Programme of the Sixth International Congress for Hygiene and Demography.

The documents (in French and English) are addressed to boards of health, educational institutions, societies, managers of hospitals, &c. The Congress will be held in Vienna, Austria, September 26 to October 2, 1887. Applications for subscription cards of delegates at 30 florins are to be addressed to the Commission on Organization, I, Renngasse 50, Vienna.

Tracts on Massage, No. III. The Uses of Massage in Medical Practice. Translated from the German of Reibmayr, with notes by Benjamin Lee, A. M., M. D., Ph. D., etc. Philadelphia: 1887. Published by the Author. Price, 25 cents.

An essay of forty-four pages, to which has been added another of twenty two pages on "Blood, and how to make it; Fat, and how to reduce it."

A fatal result from thalline is reported by Prof. Ehrlich (*Münch. Med. Wochenschr.*), after giving the thalline tartrate in progressive doses from .08 to .58 gm. He suggests 0.2 gm. (griij) as the maximum dose for hourly administration, commencing with 0.08 gm. and increasing the dose daily by 0.01 gm.

OBITUARY.

Georg Christoph Wittstein died at his residence in Munich, June 2, in the seventy-eighth year of his life. Born in Münden, Hannover, January 25th, 1810, he received his education at the classical school (gymnasium) of his native city, with which his father was connected as teacher of mathematics. At the age of 14 he entered upon his apprenticeship lasting five years, was then assistant in Clausthal, Güstrow and Hannover, passed in the latter city in 1834 the state's examination, and in the fall of 1835 went to the University of Munich to further pursue his studies. While a student here he was awarded (Aug. 12, 1836) the prize (33 florins) offered by the Society of Pharmaceutical Students in Munich, for an essay on the influence of ammonia and ammonium salts upon the solubility of, in water insoluble, oxides and salts. The judges in their report stated, among other things, that, although temperature, concentration and quantitative proportions had not been sufficiently considered, yet the researches had evidently been made by a thinking, well-informed young chemist, from whose diligence science might expect much enrichment in the future. This prediction has been well fulfilled by a long, industrious and useful life. After obtaining the degree of doctor of philosophy, he remained with Professor J. A. Buchner for fourteen years as his assistant and superintendent of the chemical laboratory. In 1851, he accepted a call as professor of chemistry, technology and natural history to the district school and agricultural institute at Anspach, but after two years returned to Munich, where he has since resided and labored for many years as private teacher and analyst.

His first literary work was an essay on impurities in commercial zinc and zinc sulphate, published in 1836 in *Buchner's Repertorium* lv, and his first critical review of a book appeared in the following year (*ibid.* lxi). During the following nearly forty years these labors were continued, since the beginning of 1852 in the "Vierteljahres-Schrift für practische Pharmacie," which periodical he conducted for twenty-two years. Aside from his journalistic labors Professor Wittstein was also engaged in other literary works, two of which have been translated into the English language; one on Practical Pharmaceutical Chemistry in 1853 by L. Darby, and the other on the Organic Constituents of Plants, more recently, by Baron von Müller. In the German language there were also published from his pen an etymological botanical dictionary; qualitative chemical analysis (1851); outlines of chemistry (1852); refutation of the theory of chemical types (1856); secret nostrums (4. edit. 1876); articles of food and drink (1878); compendium of chemicals (1879); translation of Plinius' natural history (1880-1882); pharmacognosy of the vegetable kingdom (1882), and general indices to several serial publications.

The deceased was an honorary member of the American Pharmaceutical Association, the Philadelphia College of Pharmacy and of other pharmaceutical societies of America.

Methodical, careful and painstaking as an investigator; clear, accurate and reliable as an author; just and sincere, though occasionally too severe and

harsh, as a critic—thus may be summed up, in our opinion, the causes for the intrinsic value of Wittstein's scientific labors, carried on unceasingly through half a century—an example of industry and usefulness, well worthy of emulation by the young pharmacists of the present generation.

J. Willits Worthington, PH. G., died in Moorestown, N. J., June 9, 1887. He was a native of Philadelphia, learned the drug business with Dr. S. Mason McCollin, graduated here in 1871 and was in business in Moorestown, for a few years also in Philadelphia.

VARIETIES.

Phosphate of calcium in the night sweats of phthisis.—According to Dr. Reborny, there can be no doubt that this salt has a special effect on the secretions, although the mode of its action is obscure. It has the advantage of not being at all poisonous, is easily administered, is well borne by the stomach, stimulates nutrition, and prevents diarrhœa.—*Brit. Med. Jour.*

Peroxide of hydrogen has been used by Dr. B. W. Richardson, (Asclepiad No. 13), in whooping cough with favorable results, the disease being cut short quickly and determinately. It was prescribed as follows:

Hydrogen peroxide (10 vols. strength).....	3 vj
Glycerin.....	3 iv
Distilled water sufficient for.....	3 iij

Dose half a fluidounce to be taken in a wine glass full of water.

Digitalin.—Ph. Lafon, reaches the following conclusions, as a result of his study of this substance:

(1) Digitalin is absorbed slowly. (2) It is not eliminated by the kidneys. It could not be detected in the urine. (3) It does not appear to localize itself, at least, in the form of digitalin, in any particular organ, either in acute or slow poisoning. It is not cumulative. (4) It is not sensibly modified in the digestive apparatus. It appears to undergo a complete transformation in the circulation. This change is probably effected by some oxidizing agent. (5) Digitalin offers a relatively great resistance to both physical and chemical agencies, to various ferments, and to putrefaction.—*Boston Med. Surg. Jour.* April 7, 1887; *Jour. Phar. Chim.* Jan. 1887.

Iodol in ear diseases.—Dr. Stretter, who has used iodol, the new inodorous substitute for iodoform, in a large number of cases of ear disease, finds that in acute purulent inflammatory affections iodol applications rapidly produce marked benefit, but that in chronic inflammations of the middle ear it is generally quite useless, or at best, no better than other more common methods of treatment.—*Am. Pract. and News.*

Use of salol.—Kleefeld, of Görlitz, reports from his clinic the following results obtained by the use of this drug. His use extended over a period of three months, and in thirty-five cases of rheumatism and varying forms of neuralgia he obtained the best results. There followed no ill after-effects from its administration; ringing in the ears occurred infrequently and was not severe.—*Med. News*, Febr. 19, 1887. See also *AMER. JOUR. PHAR.* 1886, pp. 380, 521, 552.

THE AMERICAN JOURNAL OF PHARMACY.

AUGUST, 1887.

SOME OFFICIAL AND NON-OFFICIAL IODIDES.

By R. ROTHER.

For sufficient reasons the *Pharmacopæia* has omitted the submission of processes for the preparation of various official chemicals; hence casual and occasional operators in this line are sometimes dependent on their own resources for the adaptation of formulas suitable to their wants. The origin of the following processes is of this nature:

Plumbic iodide.—According to a formerly official process plumbic iodide was prepared by mixing certain proportions of plumbic acetate and potassic iodide in aqueous solution. The writer has usually employed this process which yields an apparently amorphous lemon-yellow powder. Recently it was noticed that a purchased sample of the iodide possessed an orange tint, together with the peculiar iridescence of the crystalline salt. With a half-inch power it, however, evinced no crystallescence. But this indication is no positive evidence of the total absence of crystals since various amorphous bodies have the capacity of utterly concealing crystalline substances mingled with them. Plumbic acetate does not form a clear solution when dissolved in water alone. Potassic iodide is invariably contaminated with carbonate. Hence these two causes are in themselves sufficient to overcome a moderate tendency to crystallescence or to obliterate such crystals as may form. In order, if possible, to avoid such interference a solution of plumbic acetate, rendered limpid with a little acetic acid, was mixed with a solution of ferric iodide. The resulting precipitate was a mixture of plumbic iodide and free iodine. Plumbic acetate was then treated with ferrous iodide in a similar manner. A lemon-

yellow magma of plumbic iodide was formed. This, after being washed and dried, fell short by about one-twelfth of the amount theoretically required. The powder was neither iridescent or crystalline. When boiled with water the undissolved portion appeared unchanged. The solution gave a large residue of yellow crystals which a half-inch power revealed as a beautiful collection of hexagonal plates and truncated pyramids. The ferrous acetate resulting from the reaction in which this iodide was formed, appeared to exercise no special solvent power since the remarkable solubility of the powder in pure water was very striking. The presence of much acetic acid, however, considerably augments its solution. The simply aqueous solution gives with potassium iodide a faint, white flocculent precipitate. The addition of acetic acid to this mixture produces immediately a more abundant iridescent precipitate of plumbic iodide. The same result is obtained when the potassic salt is added after the acetic acid; an incomparably more intense iridescence results when the iodide of potassium is added in the solid form to the filtrate which contains the resulting ferrous acetate, together with the excess of plumbic acetate and the dissolved plumbic iodide. The profuse precipitate of plumbic iodide when stirred about in the liquid, forms satiny wavy striæ, having a deceptive crystalline aspect. Under the microscope, however, even with a quarter-inch power and higher eye-pieces, the precipitate is amorphous. The results would indicate that plumbic iodide can assume three characteristic states, namely, an extraordinary amorphous and rather soluble form; an ordinary amorphous, and a crystalline form. Whether the iridescent precipitate represents still another distinct form, or is only a mixture of the second and third, cannot be positively stated. The writer believes that the extraordinary amorphous iodide is the proper medicinal salt. The following formula represents its production. The dissolved portion may, however, be separately secured in the ordinary form by the addition of acetic acid and excess of potassic iodide:

Iron in fine wire.....	240 grains.
Iodine.....	508 "
Plumbic acetate.....	757 "
Acetic acid.....	
Water	of each sufficient.

Upon the iron wire pour three fluidounces of water, add the iodine and shake the mixture at frequent intervals until the iodine is all com-

bined and a light-green solution has resulted. In case the iron wire is extremely fine add the iodine in separate portions shaking the mixture each time until the iodine color is discharged. Pass the solution through a plain filter and follow with water until the whole filtrate measures eight fluidounces. Powder the plumbic acetate, dissolve it in four fluidounces of water and add acetic acid, drop by drop, until the solution becomes limpid. Pass the solution through a plain filter and follow with water until the filtrate measures eight fluidounces. Now pour this solution into the ferrous iodide solution, collect the yellow magma on a plain filter, wash it with water and dry the powder in the open air.

Mercuric iodide.—This salt appears in at least three peculiar states of aggregation. A white extraordinary amorphous salt, usually having but a transient existence almost invariably precedes the generation of the red ordinary amorphous salt. This latter compound is the official form and its preparation offers no special difficulties. A crystalline variety is most readily obtained by dissolving the official salt in a hot concentrated solution of sodium chloride or ammonium chloride and letting the liquor cool. The pharmacopœia states that the official salt is a crystalline powder. That the product as officially prepared is largely contaminated by the crystalline form, cannot be doubted. Such must result from the order of mixing the solutions as officially directed. In this process the first portion formed will naturally dissolve in the excess of potassic iodide, and subsequently separate in crystals as the remainder of the chloride is added. The pharmacopœia also states that the iodide is soluble in solutions of mercuric chloride. This result is also insisted on in various text-books. It is, however, an exaggeration, to say the least, since the addition of only a few drops of the iodide solution causes a permanent precipitate with the whole volume of the chloride solution. A great advantage results from dissolving the mercuric chloride by means of sodium or ammonium chloride. There is also an advantage in the use of ferrous iodide. When a solution of ferrous iodide is poured into an excess of mercuric chloride solution, containing sodium chloride, the ordinary amorphous mercuric iodide results. But in this case a considerable proportion of the iodide is retained in solution by means of an excess of mercuric chloride. The addition of potassic iodide to the filtrate gives an abundant precipitate which exhibits itself in pearly streaks, similar to plumbic iodide under the same conditions. But it rapidly becomes floccu-

lent and ultimately deposits more compactly. With a half-inch power this precipitate is seen to be composed almost entirely of prismatic needles. The writer believes that an amorphous mercuric iodide is the appropriate medicinal form. The following process is suggested to obtain such a product.

Iron in fine wire.....	240 grains.
Iodine	508 "
Mercuric chloride.....	541 "
Sodium chloride.....	240 "
Water, sufficient.	

Pour three fluid-ounces of water on the iron wire, add the iodine at intervals, if necessary, shake the mixture occasionally, until the brown color is discharged, and pass the light green solution of ferrous iodide through a plain filter. Then follow with water until the whole filtrate measures eight fluid-ounces. Powder the mercuric chloride add the sodium chloride, and pour on four fluid-ounces of water, stir the mixture until the salts are dissolved, and pass the solution through a plain filter, adding water until the whole filtrate measures eight fluid-ounces. Now gradually pour the iron solution into this, stirring the mixture meanwhile. Let the precipitate subside, and decant the supernatant liquor. Wash the residuary precipitate three or four times in succession, each time with six to eight fluid-ounces of water, then pour it into a plain filter, and expose the drained precipitate in the open air to dry.

Mercurous iodide.—It is very difficult to prepare this salt in a suitable medicinal form, although the official process gives no such indication; but the process of the pharmacopœia does not yield a desirable product. Elsewhere, November, 1884, the writer suggested a method for preparing mercurous iodide by double decomposition between potassio-mercuric iodide and mercurous chloride. The method is founded on a correct principle, but the practical difficulties presented by the rather coarse crystalline structure of commercial calomel interfere with a necessarily complete interchange of elements. Fownes' Chemistry states that mercurous oxide is readily obtained by treating calomel with solution of potash. The writer, however, found that the structural character also prevents a thorough decomposition in this case. No less than half a dozen repetitions of the process of treatment with potash and nitric acid will suffice for the practically complete conversion of the calomel into mercurous nitrate.

In either case the generated iodide or oxide surrounds the impervious calomel fragments, and thus terminates the progress of the reaction. The pharmacopœia states that calomel is an impalpable powder. The writer finds that the English calomel, which is alleged to be superior to other kinds, feels decidedly granular, and with a half-inch power exhibits a large proportion of transparent crystalline particles. That such must be the case becomes evident from the fact that sublimed calomel has a crystalline structure, and hence any degree of attrition, however extreme, cannot conceal the nature of its pedigree. When precipitated calomel, which is usually amorphous, is employed under these circumstances, perfect double decomposition results, owing to the pervious character of the molecular aggregation. It seems that the only practically available source of amorphously precipitated calomel is mercurous nitrate. This salt is itself rather difficult to prepare in a pure state and of definite composition. Its composition is variously given as $\text{Hg NO}_3 \text{ Aq}$, and Hg NO_3 . The writer prefers employing it in proportion to the molecular weight of the latter formula, as then no objectionable excess would result were it after all composed in this manner.

Mercurous nitrate is prepared by the rather tedious process of dissolving mercury in an excess of moderately dilute nitric acid. It then forms in crystals which decompose in pure water, but readily dissolve in water very slightly acidified with nitric acid. Doubtless a definite amount of freshly precipitated amorphous mercurous chloride prepared by any convenient method would be equally suitable in place of the mercurous nitrate of the following formula :

Mercuric chloride.....	68 grains.
Mercurous nitrate.....	262 "
Potassium iodide.....	166 "
Sodium chloride.....	500 "
Nitric acid diluted.	
Water.....	.....of each sufficient.

Mix the mercuric chloride, sodium chloride and potassium iodide and stir the mixture with sufficient water, gradually added, until the salts are all dissolved. Pass this solution through a plain filter and follow with water until the whole filtrate measures six fluid-ounces. Powder the mercurous nitrate, add four fluid-ounces of water and sufficient diluted nitric acid, drop by drop, until, with constant stirring, a clear solution is obtained. Warm the first solution and gradually add the second whilst stirring the mixture, or mix the two solutions

first and then heat the mixture. When, after sufficient warming, the bright yellow precipitate has firmly subsided, decant the supernatant liquor. Mix the residuary mercurous iodide with four to six fluid-ounces of water, pour the mixture into a plain filter and thoroughly wash the precipitate with sufficient water. Finally dry the powder by exposure, but shielded from strong daylight.

Bismuth-oxyl iodide.—The so-called sub-iodide or oxyiodide of bismuth is attracting some attention. Some difficulties are encountered in the production of a definite salt, having a proper form and appearance. It has been ascertained that the substance should have the composition BiOI , and that it should be an amorphous powder of a light brick-red color. The product usually obtained, although having the desired physical character, is always slightly in excess of the theoretical amount. The excess is about sufficient, in case it were water, to give the body the formula Bi OI. Aq. or $\text{Bi (OH)}_2 \text{I}$. If however, exposed to a water-bath heat for many hours, it does not lose appreciably in weight. This, however, is no serious evidence against the presence of the elements of water in some state of combination. But the preponderance of evidence seems to indicate that the bismuth-oxyl nitrate has the formula Bi ONO_3 and not $\text{Bi O NO}_3 \text{Aq.}$ according to the pharmacopœia. It is officially stated to be a heavy, white powder, nothing being said about its more intimate physical structure. When a specimen of one of the most reliable articles in the market is examined under a half-inch power it is found to be wholly made up of stunted needle-shaped crystals. This condition is also possessed by the salt resulting from the writer's process elsewhere published in September, 1884. The success of this method led the writer to apply it in the preparation of the bismuth-oxyl iodide. The peculiar feature of the process consists in generating the oxy-salt in a decreasingly acidine mixture, through the agency of calcium carbonate. When a solution of bismuth nitrate is treated with potassium iodide, either in substance or solution, a seemingly black and bulky bismuth iodide is precipitated. By adding calcium carbonate to a mixture of one m. of Bi I_3 and two ms. of $\text{Bi (NO}_3)_3$ the brick-red Bi O I results according to the following equation.

$\text{Bi I}_3 + 2 (\text{Bi (NO}_3)_3) + 3 (\text{CaCO}_3) = 3 (\text{BiOI}) + 3 (\text{Ca (NO}_3)_2) + 3 \text{CO}_2$. The presence of acetic acid exerts no solvent power, but appears to be useful, if not essential to the process. The calcium carbonate is not added to total neutrality, but merely in sufficiency to

convert the nitric acid into calcium nitrate. The first addition of the carbonate causes a yellow precipitate, which becomes more and more red with successive additions of the carbonate. When finally all the nitric acid is neutralized the brick-red compound permanently remains. Based upon these conditions, the following process is suggested :

Bismuth-oxyl nitrate.....	288 grains.
Potassium iodide.....	166 "
Calcium carbonate	200 "
Nitric acid	360 "
Acetic acid.....	2 fluid-ounces.
Water sufficient.	

Mix the nitric acid with two fluid-drams of water, and gradually add the bismuth-oxyl nitrate. To the crystalline mass which has resulted, add the acetic acid, and stir the mixture until perfect solution has resulted. Dissolve the potassium iodide in two fluid-ounces of water, and pour the solution into the previous one. To the black mixture add gradually the calcium carbonate. When the reaction is completed incorporate two fluid-ounces of water and decant the supernatant liquor after the red precipitate has subsided ; to this residue add two fluid-ounces of water, pour the mixture into a plain filter, and after having thoroughly washed the powder expose it in the air until perfectly dry.

It seems not inappropriate here to remark that bismuth pentoxide or bismuthic anhydrate might perhaps possess antiseptic properties of some medicinal value. The compound is easily prepared as a red-brown powder by treating bismuth-oxyl nitrate with excess of solution of chlorinated soda and washing the precipitate with dilute nitric acid. In this connection the writer would also state that the bismuth when present in solution in very small proportion is readily reduced to the metallic state by a large excess of an ammoniacal solution of ferrous citrate. The reduction takes place in the cold but is facilitated by heat.

When the black bismuth iodide is mixed with solution of potassium citrate a purple-red precipitate remains and acidic potassio-bismuth citrate is dissolved. On setting the liquor aside the acidic salt separates in seemingly crystalline crusts. This residue, when treated with water, again dissolves, but meanwhile gives a mixture which on stirring exhibits the striking pearly streaks already mentioned in connection with other salts. Under the microscope, however, no crystals are visible, but an abundant amorphous matter.

IMPROVED PROCESS FOR MAKING MEDICATED
WATERS.

BY RICHARD L. ISEL.

The solution of essential oils in water has always been a matter of considerable importance to the pharmacist. To produce a permanent clear and uncontaminated *medicated water* and, at the same time, avoid the tedious process of distillation, or other more or less unsatisfactory and troublesome methods, may yet be worthy of the pharmacists' attention.

The objections to the different processes and methods given in books on pharmacy may be summed up as follows :

1. Distillation is in most shops unavailable for want of apparatus, time and experience of attendants.

2. The process with the aid of earth, phosphate of calcium or carbonate of magnesium is the most objectionable, owing to the solubility of these substances in water, no matter how sparingly, thereby contaminating the product. To the careful apothecary this is a constant cause of annoyance in dispensing, as well as in the unsightly deposit it causes on the inside the shop bottle.

3. The use of cotton, although not having any of the above objections, does not yield uniform good results, since the picking of the cotton for the purpose of distributing the oil is tedious, and consequently often done imperfectly, resulting in an opaque product ; besides if absorbent cotton be used as indicated the cost of the preparation is likewise to be considered.

The following process I would suggest as an improvement on all the above. It has been used by me successfully for some time, and recommends itself in point of celerity, economy and uniformity and purity of product.

For example to make 2 pints of aqua menthæ piperitæ take a No. 33 filter ; lay it upon any smooth clean surface, a light of window glass or a pill tile, drop upon its surface thirty minims (well distributed) oil of peppermint, fold the paper and tear it into small fragments, introduce them into any suitable bottle, add one fluid-ounce of distilled water and shake the contents to a pulpy consistence ; now add water, one or two fluid-ounces at a time, two or three times consecutively, shaking well after each addition, then add all or most of the two pints of water and throw the whole upon a filter, using the reserved portion of the water to wash the pulp, and make the product measure two pints.

By using the corresponding shop bottle for the manipulation it serves the additional purpose of cleaning the same perfectly. The filter used for aqua menthæ piperitæ, if carefully dried and preserved, may be used again for the same purpose, etc.

The whole operation, excepting filtering, does not occupy over five minutes time, and the resulting preparation cannot be otherwise than pure. A No. 33 filter has been found sufficient for four pints of medicated water, although more paper may be used to make sure. For aqua camphoræ a solution is first made in alcohol as in the cotton process.

LEAVENWORTH, KAS., July 17, 1887.

ANALYSIS OF BURDOCK ROOT, LAPPA OFFICINALIS, All.

BY GUSTAVUS A. WECKLER Ph.G.

(From an Inaugural Essay.)

The root was powdered and contained then 8.21 per cent. of moisture and yielded 3.67 per cent. of ash consisting of salts of sodium, potassium and iron. The result of the proximate analysis may be tabulated as follows:

Extract by petroleum benzin: fixed oil.....	.400	.400
Extract by ether: fixed oil.....	.539	
Wax, soluble in chloroform.....	.011	.550
Extract by absolute alcohol: extractive sol. in water.....	2.210	
Phlobaphene sol. in ammonia.....	.075	
Resins.....	.965	3.250
Extract by water: mucilage, little albumen.....	4.000	
Sugar (glucose).....	5.000	
Extractive matter.....	8.400	
Inorganic matter.....	1.200	18.600
Extract by soda: albuminoids.....	2.720	
Other organic compounds.....	.200	2.920
Extract by dilute HCl, mostly organic compounds.....	4.200	4.200
Inulin, cellulin and lignin.....		70.080

The fixed oil obtained with petroleum benzin was of an orange color, dissolved in absolute alcohol and turned reddish brown with nitric acid.

The ether extract yielded to absolute alcohol an orange-colored fixed

oil, apparently identical with the preceeding; the wax was white, insoluble in petroleum and in alcohol, but soluble in chloroform. The oil saponified with potassa, the liquid becoming reddish-brown and emitting a peculiar potato like odor, the soap after salting out being yellowish and the mother liquid blood red.

The water soluble part of the alcoholic extract was successively treated in both acid and alkaline solution, with benzin, benzol and chloroform, but no indication of an alkaloid was observed. The solution acidulated with sulphuric acid was then neutralized with ammonia, precipitated with three volumes of alcohol and the filtrate tested with reagents for alkaloids without result; nor did the resinous portion of the alcoholic extract yield any alkaloidal matter when treated with dilute acid. The aqueous solution gave with ferric chloride an olive-green color, and yielded with lead acetate a precipitate which after being decomposed by H_2S yielded a soft reddish-brown mass, insoluble in benzin, benzol, ether and alcohol, and not affected by Fehling's test until it had been boiled with dilute sulphuric acid. This behavior indicates the presence of a glucoside.

The water extract mixed with two volumes of absolute alcohol yielded a precipitate consisting of mucilage, some salts and a trace of albumen. The addition of four volumes of alcohol to the concentrated filtrate did not give a precipitate of dextrin; the liquid, however, contained sugar which readily reduced alkaline solutions of cupric oxide. Indications of an alkaloid were not obtained.

The amount of inulin was not determined.

Chloral-hydrate as a vesicant.—Ivanowsky recommends (Vratch, 1886, No. 16) the external application of chloral-hydrate instead of cantharides. The former, he says, is quite as strong a vesicant as cantharides, and has not its disagreeable bye-effects. Finely powdered chloral-hydrate is dusted on an ordinary piece of strapping; on warming this the chloral-hydrate melts; it is then applied to the skin, which should previously have been anointed with oil or grease. Vesication is produced rapidly and nearly without pain and the skin does not suffer as after cantharides. After removing the fluid from the blister the skin appears nearly normal. The chloral plaster ought to be removed as soon as the blister forms, *viz.*, after ten minutes—or at the utmost after fifteen minutes. If left on longer, or if the skin has not been protected by oil, the skin suffers. Deep ulcers, which heal with difficulty, would form if the chloral-hydrate were kept on for an hour.—*Med. Chronicle*, March, 1887.

CYPRIPEDIUM PARVIFLORUM.

By E. S. BESHORE, PH.G.

(Abstract from an Inaugural Essay).

An analysis of the rhizome and rootlets of the above plant gave the following result:

Fixed oil.....	48 per cent.
Volatile oil and acid.....	.02 "
Resin soluble in chloroform, alcohol, etc.....	1.53 "
Other compounds soluble in ether.....	.49 "
Glucose.....	2.34 "
Resin and phlobaphene.....	3.08 "
Mucilage.....	3.92 "
Dextrin....	.88 "
Saccharose.....	4.44 "
Albuminoids.....	6.00 "
Starch.....	6.56 "
Cellulose and loss.....	49.15 "
Moisture.....	12.55 "
Ash.....	5.98 "
Undetermined.....	2.58 "
	<hr/>
	100.00 "
	<hr/>

A peculiar acid was found in the portion soluble in stronger ether, allied to tannic acid but distinct from it, as well as from gallic acid. The extracts which might contain alkaloids were tested with potassium triiodide, potassio-mercuric iodide, tannic, picric and phosphomolybdic acids, and auric and platinic chlorides, with negative results, as much as 750 gms. of the drug being used for one series of tests, without giving any alkaloidal result. 700 gms. of the original drug distilled with milk of lime yielded a distillate which had an alkaline reaction, and upon shaking with petroleum spirit yielded on evaporation of that solvent a few yellowish-white crystals, which were sparingly soluble in acidulated water. This solution gave a purple precipitate with auric chloride, a grayish precipitate with platinic chloride, a white one with phosphomolybdic acid and a turbidity with picric acid. In conclusion, the author states as his belief, that there exists no crystalline principle in the plant outside of the volatile constituent, and that only in a very small amount.

PRACTICAL NOTES FROM VARIOUS SOURCES.

BY THE EDITOR:

Permanent solution of mercuric chloride.—On dissolving mercuric chloride in other than distilled water, a precipitate of oxychloride is usually produced by the earth carbonates in the water. Prof. O. Angerer (*Centralbl. f. Chir.*, 1887, p. 7), states that Schilling succeeded in preventing this precipitate by the addition of sodium chloride equal in quantity to that of the corrosive sublimate. Schilling prepares also *corrosive sublimate tablets* from 1 gm., or 0.5 gm. each of the two salts mentioned; these tablets dissolve rapidly, and are adapted for distilled or any other pure water.

The facts upon which the above is based, were ascertained in 1857 by Voit (*Ann. Chem. Phar.*, civ. 341) in researches made for an entirely different purpose. He proved the existence of two double salts $\text{NaCl} \cdot \text{HgCl}_2$ and $2 \text{NaCl} \cdot \text{HgCl}_2$, both of which are freely soluble in water, and these solutions if not too dilute, may be rendered distinctly alkaline by caustic soda without being precipitated; excess of soda causes the appearance of a white, then red-brown, etc., precipitate, but this appears later, and is less rich in mercuric oxide, if a sufficient excess of sodium chloride is present.

Almén's test for sugar is a modification of Böttger's test, the reagent being prepared in solution which will keep unchanged for years (*The Lancet*, May 14, 1887). It consists of bismuth subnitrate, caustic soda and potassio-sodium tartrate. In testing for sugar in urine, the albumen, if present, must be first removed by precipitation by heat and acid, and one part of the solution treated with ten of the urine, when, if sugar is present, the bismuth will be deposited in a metallic state. The test is sufficiently delicate to detect sugar in the proportion of only .05 per cent.

Pencils of iodoform.—Two kinds are employed by Poinot (*Jour. de Méd. de Paris*, March 6, 1887), the soft variety being prepared from equal parts of finely powdered iodoform and gelatin, while the hard pencils are composed of equal parts of iodoform and cacao butter.

Coffee deodorizing iodoform.—Coffee freshly ground has been recommended for disguising the odor of iodoform. Dr. Neale (*Brit. Med. Jour.*, May 21, 1887) states that its effects last only for a limited period, and the coarse particles of the powder are apt to irritate the

sore. These objections are overcome by digesting the ground coffee in melted lard or soft paraffin, which vehicles dissolve the deodorizing principles, and after straining form smooth and unirritating bases for ointments of iodoform.

Manganese biniodide has recently been recommended in medical journals in the treatment of amenorrhœa, given in the form of pills, containing 2 grains each. A formula for the preparation of this so-called biniodide has not been given; very likely the *manganous iodide*, $Mn I_2$, also known as *protiodide*, is intended. This compound is as difficult to prepare and keep in the solid state in an unaltered condition as the corresponding iron compound, and like the latter is best administered in the form of syrup, for which the late Prof. Procter published a good working formula in 1850.

Solution of carbon bisulphide in typhoid fever is recommended by Dr. Dujardin-Beaumetz (*Jour. de Méd. de Paris*, 1887, xii, 194,) to be prepared as follows:

Bisulphide of carbon.....	25 gm.
Water.....	100 gm.
Oil of peppermint.....	30 drops.

This is put into a bottle capable of holding 700 gm. (22 oz.) well agitated and then allowed to settle. Of the clear watery solution from 8 to 12 tablespoonfuls are given during the day, each dose being mixed with a half tumblerful of aromatic water or milk. A quantity of water should be added to the bottle equal to the solution taken by the patient.

Glycerite of resorcin has been used by Dr. H. P. Chase (*Peoria Med. Jour.*, June, 1887, p. 87) in eczema, as follows:

Resorcini	3 ij
Glycerini, q. s. ad.....	3 ij

M. Sig.—Apply with camel's-hair pencil morning and evening.

Paraffin oil in hypodermic injections is recommended by Dr. Albin Meunier (*Bull. gén. de Thér.*, 1887, p. 21). All the hydrocarbons of the marsh gas series are diffusible in the animal tissues, but their diffusibility varies inversely with their consistence. A large number of medicaments have been experimented with; the following formulas show the manner of using the solvent:

1. Pure eucalyptol, 5 gm.; paraffin oil, 20 gm.
2. Eucalyptol, 5 gm.; iodoform, 0.25 gm.; paraffin oil, 20 gm.

Given as injections these solutions are tolerated in doses from 1 to 15 grams per day and even more.

3. Carbon bisulphide, 1 gm.; paraffin oil, 19 gm. Used repeatedly in small quantities, from one to two grams through the day.

4. Pure terebenthene, 5 gm.; paraffin oil, 20 gm. This is tolerated in daily quantities of from 1 to 10 grams.

Some paraffin oils, on being saturated with pure phenol, and moderately heated, acquire a rose color, and form a violet-colored precipitate, which is augmented in the intensity of color on the addition of alcohol. Such paraffin oils should be rejected for hypodermic use. The impure oils are usually colored black in contact with sulphuric acid. (See also *AMER. JOUR. PHAR.*, 1887, p. 349.)

At a meeting of the Paris Société de Thérapeutique, Dujardin-Beau-metz called attention (*Prog. méd.*, Feb. 12, 1887) to the solvent powers of *huile de Bakou*, paraffin oil, and stated that the oil is innocuous, and could be used with advantage subcutaneously as a vehicle for various irritating compounds, the acrid nature of which was thus very materially modified. It dissolves fixed and volatile oils, camphors, benzol, carbon bisulphide, iodoform, iodine, bromine and phosphorus. To be adapted for such use, paraffin oil should not have been treated with sulphuric acid, but should be neutral to test paper, inodorous and tasteless, and should not give off vapors below 180° C.

Adrian (*Les nouv. Rem.*, April 24, p. 171) observed a distinct acid reaction on the treatment with hot alcohol of Russian and American paraffin oils, as well as that prepared from soft paraffin with ether at -10° C. (14° F.) The specific gravities of these oils varied from 845 to 880. To be adapted for medicinal purpose such oils should be colorless, not fluorescent, inodorous, insipid, and of the density 875 to 890; when heated to 50° C. they should not give off the odor of petroleum, and nothing should distil over below 360° C. (680° F.); at -15° C. (5° F.) they should neither congeal nor become turbid; they should not impart an acid reaction to hot alcohol, and when treated with sulphuric acid in a water-bath for 24 hours, should at most produce a light-brown color.

From a paper by Dr. J. Ley, in *Les nouveaux Remèdes*, April 8, it appears that Dr. Balzer experimented in the direction indicated in 1886, and in November communicated his observations to the Société de Biologie. Digitalin, aconitine, quinine and other alkaloids may thus be administered, but require to be dissolved in chloroform or

ether before mixing with the paraffin oil. For various reasons Dr. Ley prefers a vegetable oil as a vehicle for hypodermic injections, and finds that

Purified groundnut oil answers the purpose well. The purification is effected by bleaching in the sunlight, decolorizing with animal charcoal, and sterilizing; it is then an excellent vehicle for volatile oils, iodoform and phenol, and of the latter rather concentrated solutions, —containing from 3 to 10 per cent. of phenol—may be used. The phenol solutions are made with the aid of a moderate heat.

The therapeutic equivalents of quinine salts was the subject of a paper recently communicated to the Paris Société de Thérapeutique by Dr. Boymond. The accompanying table gives in a condensed form much information of great practical value to the pharmacist and physician :

Salts	Percentage of			1 part soluble in water at 15° C.	1 part water dis- solves		1 part anhydrous quinine contained in
	Alkaloid	Acid	Water of crystall- ization		Salt	Anhy- drous quinine	
Hydrate.....	85.72	.....	14.28	16.70	.00059	.00050	1.16
Acetate.....	84.37	15.63	.....	slightly	.....	.....	1.18
Hydrochlorate.....	81.71	9.21	9.08	21.40	.046	.0388	1.22
Lactate.....	78.26	21.74	.....	10.29	.097	.0759	1.27
Hydrobromate.....	76.60	19.15	4.25	45.02	.022	.0168	1.30
Valerianate.....	76.06	23.94	.....	53.70	.029	.0220	1.31
Sulphate.....	74.31	11.24	14.45	581	.0017	.0012	1.34
Sulphovinate.....	71.20	28.80	.....	3.30	.303	.215	1.39
Arseniate.....	69.38	15.21	15.41	slightly	.....	.....	1.44
Salicylate.....	68.79	29.30	1.91	863	.0011	.0007	1.45
Citrate.....	67.08	19.86	13.06	820	.0012	.0008	1.49
Bromhydrate (neu- tral).....	60.67	30.34	8.99	6.33	.158	.0958	1.64
Sulphate (neutral)..	59.12	17.89	22.99	8.81	.113	.0668	1.69
Ferrocyanhydrate...	56.25	37.50	6.25	slightly	.....	.....	1.77
Hydriodate, acid....	55.95	44.05	.....	.....	.....	.....	1.78
Tannate.....	22.60	67.36	10.04	800	.0012	.00028	4.42

The figures given above differ to some extent from those adopted by the French, United States, and other pharmacopeias.

Resin of guaiacum is regarded by Sir James Sawyer (*Birmingh. Med. Review*, Jan. 1887) as a valuable emmenagogue in a large proportion of cases of amenorrhœa; it is given in doses of ten grains, stirred in a wineglassful of milk, every morning before breakfast. The ammoniated tincture of guaiacum may be given during the painful period, in certain cases of dysmenorrhœa, in doses of half a drachm to a drachm in a wineglassful of water every two or three hours till the pain is relieved.

ABSTRACTS FROM THE FRENCH JOURNALS.

[Translated for the AMERICAN JOURNAL OF PHARMACY.]

SALICYLATE OF LITHIUM.—M. Julliard, a French pharmacist, finding that his solutions of this chemical soon changed to a dark brown color, investigated the cause of the alteration, which he explains, in the *Bull. Comm.* for June. Of six samples, obtained from large drug establishments, four gave an acid reaction and two were neutral. The latter, which were pure, turned of a dark coffee-color in six or seven days; the four others, which he found to contain salicylate of sodium, were found to be colorless at the end of thirty days. Investigation led to the conclusion that the salicylates of lithium sold to pharmacists contain from 12 to 15 per cent. of salicylate of sodium, which costs about one quarter the price of the lithium salt. He suggests that when pharmacists make solutions of the pure (neutral) salicylate of lithium, they should add a slight excess of salicylic acid in order to render the solutions stable and thus keep them colorless.

LITHIUM PILLS are proposed by P. Vigier, (*L'Union Phar.* June) to replace a similar composition in fluid form recommended by Martineau for glycosuria of arthritic origin. The formula is: Carb. lithium 0.10 gm.; arsen. sodium 3 mgm.; ext. gentian 0.05 gm.; for one pill to be taken night and morning, and continued until the sugar has disappeared from the urine.

QUALITATIVE TEST FOR SULPHITES IN PRESENCE OF HYPOSULPHITES AND SULPHATES.—In treating neutral solutions of alkali sulphites with chloride of barium we obtain a double decomposition: $K_2SO_3 + BaCl_2 = BaSO_3 + 2KCl$, and the liquor, strongly alkaline at first, becomes exactly neutral. If we treat a solution of alkali bi-sulphite in the same way a neutral sulphite of barium is also formed, and half of the sulphurous acid is set free: $2KHSO_3 + BaCl_2 = 2KCl + BaSO_3 + H_2SO_3$. Therefore a mixture of alkali sulphite and bi-sulphite which has a clearly alkaline reaction, will contain free sulphurous acid after the addition of chloride of barium. This suggests a quick method of testing. It suffices to neutralize the mixture of sulphites and hyposulphites by hydrochloric acid, being careful to avoid excess, and to precipitate with chloride of barium. The sulphurous acid will pass over on distilling, and the filtrate may be titrated with iodine.—*Bull. Comm.*, June.

NEUTRAL HYDROCHLORATE OF QUININE has a great advantage

over the basic salt, being soluble in its weight of water, while the latter requires twenty-two times that quantity. To make it, M. Clermont (*Com. Rend.*), dissolves in distilled water, 1 eq. (548 gm.) neutral sulphate of quinine, and mixes this with a solution of 2 eq. (208 gm.) of dried chloride of barium. After separating the sulphate of barium, the liquor is evaporated (below 100°), leaving the solid neutral hydrochlorate of quinine. The solution of this salt is, of course, bitter, but is entirely free from any caustic quality, thus making it as desirable for hypodermic use as it is for delicate conditions of the stomach.

SACCHARATED CASEIN.—M. Léger says further, (See *AMER. JOUR. PHAR.*, 1887, p. 350), that this substance keeps well; at the end of three years a sample exhibited had also lost a portion of its odor. A very small quantity of ol. neroli, added at the time of preparation, completely neutralizes the odor. When allowed to stand, emulsions from the saccharate coagulate like milk, and the coagulum retains the fatty body.

A REMEDY FOR BURNS, proposed by M. Dubois (*Jour. de Méd. de Nantes*), consists in allowing the contents of a siphon of Seltzer water to flow slowly over the affected parts. It quiets the pain almost instantly, and the writer believes it hastens the final cure. He ascribes the good effect to the carbonic acid gas, and to the local lowering of temperature.

RAPID PREPARATION OF COLLODION.—M. Chevreau proposes (*Jour. de Phar.*, June), that the ether be poured first upon the pyroxylin while agitating the mass, and the alcohol added as soon as absorption is completed.

ANTISEPTIC INSUFFLATIONS FOR WHOOPING-COUGH.—According to the *Arch. de Phar.*, July, several practitioners, convinced of the microbian nature of whooping-cough, are using intra-nasal insufflations of antiseptic powders for it. Michael (of Hamburg) recommends powdered benzoin once a day. Moizard uses a powder composed of benzoin and salicylate of bismuth of each 5 gm., and sulphate of quinine 1 gm., three or four times daily. Each naris must be insufflated. A rubber tube is used; the powder is introduced into one end, which is fixed in the naris; the other end is placed in the mouth, and the powder blown to its place.

NAPHTHALIN is said to have been used successfully by Rossbach (*Jour. de Phar. d' Ale-Lor.*), in chronic diarrhœa. Bouchard considers it valuable for obtaining antiseptics in cholera and typhoid fever. It is serviceable in vesical affections when the urine is to be disinfected. In the form of pomade it is used for eczema and psoriasis. It serves

also to replace ac. carbol. in surgical dressings, either as a pomade or as a liquid containing 30 gm. to 1 kilo of alcohol. For internal use, Bouchard recommends this formula: Naphthalin 5 gm.; sugar pulv. 5 gm.; oil of bergamot 2 drops; to make 20 parts, one to be taken every hour. Mâreau recommends that it be taken in gluten capsules containing 0.25 gm. each; they dissolve only in the intestine. See also AMER. JOUR. PHAR., 1886, p. 93, and 1887, p. 128.

THE EXCRETION OF UREA is shown by Chibret (*Comptes rendus*), to be increased enormously by a strictly followed regimen of milk. If this diet be exclusive the augmentation equals 60 per cent. If the regimen consist of one half milk, the increase is 35 per cent. Physicians have been unable to discover the mode of action of this aliment. It would seem that it modifies the composition of the albumen of the blood, and tends to reduce the insufficiently oxidized nitrogenous waste.

LAMIUM ALBUM is thought by Dr. Florain, (*Bull. Gén. de Thérap.*, June 15,) to be fully equal to the *urticeæ* as a hæmostatic. He claims great success with a preparation composed of the tincture, 100 gm., simple syrup 50 gm., and water 25 gm. Dose, a tablespoonful every half hour until the hemorrhage ceases; then, the same dose every few hours. Dr. Florain believes he has separated the active principle of the plant in the form of an alkaloid which he names *lamine*. His method of finding it was to treat 500 gm. of the stems gathered at the time of flowering, with hydrochloric acid and boiling water for half an hour. The liquor was treated with milk of lime and the precipitate extracted with boiling 80 per cent. alcohol. This was filtered and distilled to a syrupy consistence, when it gave, with sulphuric acid, a somewhat abundant white precipitate. This dissolved in boiling water gave, on cooling, long crystals "similar to those of sulphate of quinine." This substance dissolves in boiling water, is less soluble in alcohol, and has a neutral reaction.¹ The alkaloid was given hypodermically, both as a sulphate and a hydrochlorate in somewhat high doses without toxic effects. The hæmostatic effect of the alkaloid was promptly obtained. The writer hopes that analogous researches will be made with *Urtica dioica* and *Urtica urens*.

¹ The process furnishes *calcium sulphate*. The supposed pure alkaloid, obtained by boiling the sulphate with ammonia, is the same salt; it is stated to be a white powder, having a neutral reaction and a slightly saline taste, little soluble in water, and insoluble in alcohol, ether, chloroform, and cold dilute sulphuric acid.—EDITOR AMER. JOUR. PHAR.

NOTE ON A MIXTURE CONTAINING SULPHATE OF QUININE AND BICHLORIDE OF MERCURY.

BY T. H. POWELL.

The incompatibility of sulphate of quinine and bichloride of mercury is, I think, not very generally known, and was first brought to my notice a few weeks ago when dispensing a prescription, of which the following is a copy :—

Tinc. ferri perchlor.....	℥ vj
Quin. disulph.....	gr. xlvijj
Acid. hydrochlor. dil.....	q.s.
Liq hydrarg. perchlor.....	℥ iv
Aq. dest.....	ad ℥ xij
M.	

The quinine (Howard's) was dissolved in the tincture of perchloride of iron and half a drachm of dilute hydrochloric acid added ; this was diluted with water, and finally the solution of perchloride of mercury poured in, a perfectly clear straw-colored mixture resulting. After standing a few minutes, however, a heavy granular precipitate began to form, a considerable quantity ultimately collecting at the bottom of the bottle, and remaining undissolved after the addition of a drachm more dilute acid. The same result followed when the mixture was made a second time, the sulphate of quinine being first dissolved in an increased quantity of acid. On examination I found the clear liquid still gave evidence of bichloride of mercury in solution, and the precipitate, as might have been expected, proved to be a double chloride of mercury and quinine. We may perhaps, infer, as the dispenser is directed to use "a sufficient quantity" of dilute hydrochloric acid, that the writer of the prescription was aware of the formation of a precipitate, but believed it was merely due to the inability of the tincture to retain the quinine salt in solution ; the addition of the acid, however, does not effect the desired result. I find no mention of the incompatibility of these salts in Squire's 'Companion,' and Pereira merely says a salt of quinine is precipitated on the addition of tannic acid, ammonia, perchloride of mercury and perchloride of platinum, a statement likely to mislead when the character of the respective precipitates is taken in consideration.

I would, therefore, draw attention to the fact that when mercuric chloride and quinine salts are combined in a mixture they form a very sparingly soluble double chloride, which, unless the quantities are

small, will be partially precipitated even in the presence of free hydrochloric acid. The dispenser should therefore direct the bottle to be shaken, for however bright the mixture may be when first made up, a precipitate, dangerous because of its weight, may separate after the lapse of some little time.—*Phar. Jour. & Trans.* June 11th, 1887, p. 1010.

QUININE TESTING.¹

BY DR. O. HESSE.

The subject of quinine testing has recently been made prominent by the circumstance that the long-known presence of cinchonidine sulphate in commercial quinine sulphate has been again discovered by De Vrij, and an importance has been attached by him to his discovery which it does not possess, and probably will never acquire. But the vehement outcry raised by De Vrij as to this fact, supported by the incorrect results he had obtained by the optical method of testing, has at least had the effect of directing more critical attention to the test of the German Pharmacopœia, the defects of which I had previously pointed out. Though Vulpinus some weeks ago expressed the opinion that the problem in question had been solved by means of Schäfer's oxalate test, it is evident, from the fact of Schäfer having very soon supplemented that test by the tetra-sulphate test, which was represented as giving better results than the oxalate test, that it was not altogether free from defect.

In this position of the matter, and in order to satisfy the demands made upon me, it appeared appropriate that I should take up the discussion. But before entering more in detail upon the subject of quinine testing, I think it desirable that I should endeavor to answer the question as to what admixtures of alkaloids may be expected to obtain in the manufacture of quinine sulphate, and to inquire to what extent there may be any justification for the assertions of De Vrij that the therapeutic value of quinine sulphate is reduced by the presence in it of these possible admixtures.

Chemically pure quinine sulphate, free even from hydroquinine, crystallizes in heavy needles, according to my observation. By means of certain mechanical devices it may indeed be obtained in a some-

¹ From the *Pharmaceutische Zeitung*. Reprinted from *Phar. Jour. and Trans.*, May 28, 1887.

what lighter form, but not of such a light flocculent character as the sulphate usually prepared and answering to the test of the German Pharmacopœia. The light character of the latter is, therefore, due to some other circumstance, and especially to the presence of small admixtures of the sulphates of hydroquinine and cinchonidine, possibly also of hydrocinchonidine and homocinchonidine. The sulphates belonging to the cinchonidine group can be separated from quinine sulphate without interfering with its light form when it happens that there is a sufficient amount of hydroquinine present.

Quinine sulphate does not assume the light character in question as a result of the presence of quinidine or cinchonine sulphates; moreover, it has not the least tendency to crystallize together with either of these salts. It is true, Jungfleisch states that quinine sulphate made from cuprea bark contains quinidine, which separates in crystals when such quinine sulphate is subjected to my test, but so far as my observation goes this statement is not supported by experiment.

Leaving out of consideration for the moment hydroquinine—which, as I shall show in a subsequent paper, approximates very closely indeed to quinine in its chemical nature—as well as the traces of hydrocinchonidine and homocinchonidine that are now and then met with in normal quinine sulphate, cinchonidine is the only adventitious alkaloid that has to be taken into account as being not unfrequently present in large amount in the bark from which quinine sulphate is manufactured. The Ceylon bark, which is now so abundant in the market, is for the most part especially rich in this alkaloid. But notwithstanding this disadvantage, it is still the case that in the old-established quinine factories quinine sulphate that contains only a very small amount of cinchonidine sulphate is made from this bark.

It may indeed be safely assumed that formerly, when the method of manufacture was less perfect than it is at present, quinine sulphate contained a much larger proportion of cinchonidine, although the bark then employed for the purpose generally contained a smaller amount of cinchonidine than at the present time. But even then the amount of cinchonidine was limited by the prescribed method of testing. So far as I am aware, Liebig's test was then most in use, and, as I have shown in another place, it indicates the presence of cinchonidine only when amounting to more than 10 per cent. I, therefore, consider it very probable—and in this respect I agree fully with De Vrij's opinion—that in his time the therapeutic value of quinine

sulphate was ascertained with a salt that contained cinchonidine, and contained at least several per cent. It is, however, now known that cinchonidine acts in the same manner as quinine, if only with one-fourth the potency. If this relation be considered, it must also be admitted that a diminution of the therapeutic value of quinine sulphate, due to the presence of a few hundredths of cinchonidine sulphate, could not be appreciably expressed in figures at all. Consequently, in the case now under consideration, it is not with therapeutic value that we have to do, but it is only the pecuniary question that has perhaps to be taken into account.

This latter consideration, combined with the circumstance that formerly cinchonidine was not separated from quinine at all, was, in fact, the reason for De Vrij's suggestion that the two alkaloids should not be separated, and, indeed, that none of the cinchona alkaloids should be thus separated. As is well known, this opinion led to the discovery of "quinetum." It is true De Vrij defined the idea of quinetum as representing a constant mixture of the alkaloids obtainable from the bark of *Cinchona succirubra* that would always give a rotation equal to $(\alpha)_j = -38^\circ$, though in reality it is a "misch-masch" of alkaloids, such as the bark may happen to furnish, and though it is lævogyre, it is not uniformly so. Besides this, the compound of part of such a "misch-masch" of alkaloids with sulphuric acid is prepared and brought into the market as "quinetum sulphuricum." While quinetum itself is a yellow or yellowish-white powder, quinetum sulphuricum is in the form of delicate white needles, and by reason of its great resemblance to quinine sulphate, it is well adapted for the adulteration of that article. This is the preparation that De Vrij on another occasion, in 1877, proposed should replace quinine. It is true that this proposed substitution was, as it appears, to apply only to the case of half-civilized people. To judge from the remarks made by Vulpinus in reference to this preparation, it may be inferred that he is not acquainted with its nature, and, therefore, I will give here the results of some analyses of it:

Quinetum :

	1875. Hesse. Per cent.	1879. Oudemans. Per cent.
Quinine	14.96	6.1
Cinchonidine	35.29	22.9
Cinchonine	21.08	37.0

	1875. Hesse. Per cent.	1879. Oudemans. Per cent.
Quinamine.....	trace	4.5
Amorphous alkaloid.....	21.06	21.2
Sodium carbonate.....	—	2.9
Sulphuric acid.....	1.21	—
Water.....	6.01	2.7

Quinetum Sulphuricum :

	1875. Hesse. Per cent.	1876. Hesse. Per cent.
Quinine sulphate.....	14.14	11.91
Cinchonidine sulphate.....	62.92	61.17
Cinchonine “	22.94	26.92

In another sample of *quinetum*, Oudemans found only 1.1 per cent. quinamine, but 0.3 per cent. quinidine and 0.5 per cent. quinidine.

From the foregoing remarks it will be seen that quinine, which chiefly determines the medicinal value of cinchona bark, is present in the preparation called *quinetum* only in small amount, and that the *quinetum sulphuricum* which was represented as being directly comparable with quinine sulphate contains no less than about 87 per cent. of the associated alkaloids, and among them about 63 per cent. of cinchonidine sulphate. Closely approximating in character to this latter preparation is the quinine sulphate the English government prepared in their factories in India, containing, according to the data published by Hooper, 40.88 cinchonidine sulphate and 59.12 quinine sulphate; or, as Hooper calculates, 37.55 cinchonidine sulphate and 62.45 quinine sulphate. All this meets with approval from De Vrij.

It is therefore inexplicable to find De Vrij contending that quinine sulphate is depreciated in its therapeutic value by the presence of a small percentage of cinchonidine sulphate, and that for this reason it must be prepared absolutely free from cinchonidine. In any case, such an assertion by De Vrij is unjustifiable so long as he continues to maintain the opposite view as to the above-mentioned preparations and warmly advocates their use.

I completely agree with Vulpius in the opinion that a preparation sent out as quinine sulphate, and to be used as such, ought to contain only a moderate proportion of the associated alkaloids, and it is upon this very ground that I raised objections to the test given in the first issue of the German Pharmacopœia. Subsequently I pointed out how the least trace of cinchonidine could be detected with certainty in

quinine sulphate. On the basis of my long experience of this subject, I proposed to the Pharmacopœia Commission in 1882 not only a test which would without difficulty admit of the detection of a small admixture of cinchonidine sulphate, but also sent a report that was read by the late Professor Fehling at a meeting of the Commission, in which I fully discussed the whole subject, and pointed out the defects of the test in the Pharmacopœia. Notwithstanding this, only Professors Fehling and Otto were in favor of my test being adopted, all the other members preferring to adopt Kerner's test on the recommendation of Professor Flückiger, although I had shown in my report that with quinine sulphate that is not effloresced, or only partially so, a large portion of the cinchonidine sulphate present would escape detection by that test.

In reply to the objection raised by Vulpius to my proposed test, that I desired to pass a less pure quinine sulphate than the Pharmacopœia and the German pharmacists required, I can therefore refer to these facts as proving that his opinion in that respect is entirely unfounded.

The test proposed by me was as follows :

Take 1 gram of the quinine sulphate dried at 100° C., shake it with 20 c.c. of water at 60° C., filter after cooling, and place 5 c.c. of the filtrate in a narrow test tube with 5 c.c. of ether and 5 drops of ammonia solution ; close the tube and shake the mixture. The clear ether solution thus obtained should not afterwards deposit crystals. The settlement of the point as to the time to be allowed for such a deposit to take place I left to the Commission ; also the decision whether quinine sulphate with two or more per cent. of cinchonidine salt was to be passed.

It will be seen that this test was very similar to that I had previously recommended ; it was simply an improvement upon that by which I had done away with defects of which I had become aware by long experience.

The principle on which this test is based is the fact, unfortunately still insufficiently known, that the compound of cinchonidine sulphate with quinine sulphate is decomposed at 100° C., and in a certain way disintegrated, so that the whole of the cinchonidine sulphate present is acted upon and dissolved by the water used. Although in contact with water a partial combination of the associated sulphates may be induced, by far the greater part of the cinchonidine sulphate passes

into solution, while the quinine salt remains almost entirely undissolved. If it were possible to leave the quinine salt completely undissolved there would be no reason to fear any loss of cinchonidine sulphate, but some of the quinine sulphate is dissolved at 60° C., and thus opportunity is afforded for a small portion of the dissolved cinchonidine salt to form a certain quantity of a double compound, which is afterwards deposited in amount corresponding to its solubility. Thus it happens that the whole of the cinchonidine is not obtained in solution in such an experiment. But in any case such a mode of extraction is more complete than when the sulphate is boiled with water, or dissolved in boiling water, since in the latter case there will be not only a decomposition of quinine sulphate attended with elimination of quinine (which can be extracted by benzol), but since a greater part, and perhaps the whole, of the quinine sulphate will then pass into solution, a larger portion of the cinchonidine sulphate will again become latent from formation of the double salt when crystallization takes place. For this reason I cannot approve of the modification in my original test which Schäfer suggested, nor can I confirm the condemnation that he pronounces upon all tests which do not involve a complete solution of the whole of the quinine sulphate during the operation, though I admit that by complete solution of the material tested mixed crystallizations may be placed on the same level as artificial mixtures. This latter result may, however, be obtained simply by allowing the mixture to effloresce at a moderate temperature.

In reference to the other tests that have recently been proposed, that of Kremel may be mentioned as very delicate, but, like other titration methods, it has the disadvantage that it must necessarily be assumed that the substance examined actually contains the constituent that is to be determined by the operation. This condition cannot be ensured in the case now under consideration; consequently that method of testing is inapplicable quite independently of the circumstance that when the commercial quinine sulphate containing cinchonidine sulphate is heated with hot water, as Kremel directs, a solution is not unfrequently obtained on cooling which does not contain the sulphates in question in the same proportions as water solutions of each of them separately would do.

The bisulphate test, recommended by De Vrij, has a sounder foundation, and it yields very good results when it is carried out with the

modifications I have suggested. It requires, however, the use of very pure ether, as is, indeed, the case with every form of cinchonidine determination that is carried out with ether. The modification of this test introduced by Schäfer is less to be relied upon, probably because the evaporation of the ether solution is attended with such a concentration of the quinine as to have the effect of hindering the crystallization of the alkaloid or its compound. It may be for this reason that Schäfer was unable to obtain crystals of "cinchonidine" in operating upon quinine sulphate known to contain 2 per cent. of cinchonidine sulphate. I have no hesitation in affirming that the crystals obtained by the bisulphate test, as modified by Schäfer and described by him as "pure cinchonidine," are a compound of quinine with two molecules of cinchonidine. As I have shown on another occasion, this bisulphate method always gives a cinchonidine result that is too high in the case of a sample containing only a small amount, and with one containing a larger amount the result obtained is too low. On the whole, however, the results obtained by this test are very satisfactory, and they are obtained with one operation, while the recrystallization test, recommended by Dr. Paul, appears to require several successive operations.

It is well known that Paul was the first to direct attention to the occasionally considerable amount of cinchonidine sulphate in the quinine sulphate of commerce. His method of ascertaining the amount of this impurity consists in dissolving 5 grams of the salt in question in 150 c.c. of boiling water and, after cooling the solution, treating the mother-liquor thus obtained with ammonia and ether. The recrystallized sulphate is to be again treated with 100 c.c. of boiling water, and the mother liquor, obtained after cooling, subjected to treatment with ammonia and ether, this operation being repeated until no more crystals are deposited from the ether solution thus obtained. These crystals, however, are not pure cinchonidine, but the compound already mentioned. Consequently the amount of cinchonidine indicated by weighing them is too high by the amount of quinine they contain. If the mother-liquors were treated with ether direct this surplus would be to some extent reduced by the circumstance that it would not then be possible to obtain the whole of the cinchonidine in a state for weighing. But if the mother-liquors are concentrated by evaporation so as to allow of less ether being used, satisfactory results are readily obtained. The mode of procedure I adopt in applying this test is to

dissolve 5 grams of the sulphate in question in 150 c.c. of boiling water, and after the cooled solution has crystallized the mother-liquor is separated by filtering with the aid of suction. The partially-dried residue left on the filter is then boiled with another 120 c.c. of water, and this operation is repeated as often as may be necessary for removing the whole of the cinchonidine. In the case of a salt containing 5 per cent. cinchonidine sulphate at least three such operations will be requisite, and a salt containing 9 per cent. will require at least five recrystallizations. The mother-liquors obtained in the first three operations are then mixed together and evaporated at a moderate heat almost to dryness; the saline residue is dissolved by a few drops of dilute sulphuric acid, and the solution, made up to the volume of 20 c.c. by addition of water and ammonia solution, is shaken with 16 c.c. of ether. After the lapse of twenty-four hours the crystals that may have separated from the ether solution are collected and weighed. The mother-liquors from subsequent recrystallizations are evaporated separately to the volume of about 8 c.c., and after being shaken with ammonia and 2 or 3 c.c. of ether they are left at rest for twenty-four hours for the separation of crystals.

For the purpose of comparing the results obtainable by this method of recrystallization, and by the bisulphate method of testing, the following experimental data are given. No. I. was an old sample of French manufacture, which would not stand the test of the present German Pharmacopœia, and No. II. a sample of German make, which just passed that test, and therefore contained an amount of cinchonidine sulphate that was within the limits allowed:—

Bisulphate Test:

	Crystals.	Cinchonidine sulphate. Per cent.
I.	0.534	= 8.94
II. ....	.302	= 5.09

Recrystallization Test:

Mother-liquors.					
1, 2, 3.	4.	5.	6.	Crystals.	Total.
					Cinchonidine sulphate. Per cent.
I.	0.505	0.046	0.007	0	= 0.558 = 9.34
II.	.262	.015	.0		.277 4.64

From this comparison it appears that both methods of testing furnish results which agree in a satisfactory manner, and consequently it

is optional which mode of testing is applied for ascertaining the amount of cinchonidine sulphate in the quinine sulphate of commerce.

I may mention here that the compound of quinine and cinchonidine obtained in applying the bisulphate test to commercial quinine sulphate will also contain hydroquinine, and probably also in some cases hydrocinchonidine and homocinchonidine in small proportions, so that if the crystals separated were tested for quinine by the optical method it would give results decidedly too low. This is less to be feared with the recrystallization test, because hydroquinine, which has the greatest influence on the result of the optical test, would not be concentrated in the mother-liquors.

De Vrij's bichromate test is quite unsuited for the quantitative determination of cinchonidine, though it admits of its presence being detected when it amounts to only 0.3 per cent. The reason of this is that as the amount of cinchonidine increases, more or less of it is precipitated with the quinine chromate. It is probably on this account that in applying the test to a sulphate containing 2.7 per cent. cinchonidine sulphate, as Schlickum recommends, I did not obtain immediate indications of the presence of cinchonidine, and only a few crystals were formed after the lapse of an hour. The crystals obtained by this test also contain quinine, and are a compound of quinine with seven molecules of cinchonidine.

This is also the case with the oxalate test, and what Schäfer originally took for pure cinchonidine contains quinine, as he has since admitted. The amount appears to be considerable, as I infer from the fact that when dissolved with excess of sulphuric acid the solution has a strong fluorescence, and it becomes intensely green when mixed with chloride of lime and ammonia.

According to the directions for applying this test the precipitate formed on adding soda solution to the filtrate from the quinine oxalate is not to be collected until after twelve hours, and for each 100 c.c. of liquid an addition of 0.04 gm. is to be made to the weight of the precipitate as a correction for the cinchonidine remaining in solution. When the amount of cinchonidine exceeds 4 per cent., the addition is to be 0.066 gm., and the concentration of the solution must be kept to 1 in 50.

Objection has been made from several quarters to this test that too little potassium oxalate is used for precipitating the quinine. But that is not the case, for normal potassium oxalate has only one mole-

cule of water, and with quinine sulphate containing 15 per cent. water 0.42 gram oxalate would be requisite, or with completely effloresced sulphate 0.47 gm.

Another defect of the oxalate test is in the direction as to time. With 60 c.c. of liquid half an hour is not sufficient for obtaining a temperature of 20° C. throughout the whole mass, and this is still more the case with larger quantities. For this reason I have always allowed one hour.

Quinine oxalate is, as Schäfer states, almost insoluble in the presence of potassium oxalate, while cinchonidine oxalate is readily soluble. When a cold saturated solution of quinine oxalate is mixed with the proper quantity of potassium sulphate and an excess of potassium oxalate, the quinine oxalate is at once separated so completely that caustic soda gives no precipitate in the filtrate. On warming the oxalate dissolves, but it separates again completely on cooling. If, however, one per cent. of cinchonidine sulphate be added, and the liquid again warmed, a very much smaller quantity of quinine oxalate separates on cooling than in the former case, showing that the presence of cinchonidine exercises a solvent influence on the quinine oxalate. It is evident, therefore, that in operating upon a mixture a certain portion of quinine remains in the mother liquor, and consequently the precipitate produced in such a solution by caustic soda is not pure cinchonidine. Moreover, cinchonidine is precipitated with the quinine oxalate, and in both cases the proportions thus escaping separation appear to be determined by accidental conditions. Hence it is not possible to estimate from the precipitate produced whether the cinchonidine salt amounts to 2 per cent. or only 0.5 per cent. without a quantitative determination.

Assuming that in operating upon quinine sulphate containing 0.5 per cent. cinchonidine salt, the precipitate obtained after twelve hours is 0.001 gm. (it is really rather more) the addition to be made to this for 60 c.c. of solution would be 0.024, and the 2 gm. would accordingly appear to contain 0.025 of pure cinchonidine, or 1.685 per cent. of sulphate, at least three times as much as the salt actually contained. A direct experiment under these conditions gave 1.77 per cent. The result is still more unsatisfactory when the amount of cinchonidine salt is larger, and the concentration of one to fifty has to be kept to. In operating with a mixture of 1.875 of quinine sulphate and 0.125 cinchonidine salt, corresponding to 6.25 per cent., the result

obtained showed 9·22 per cent., or nearly 3 per cent. more than was really present.

If such known mixtures give differences of this kind, little is to be expected of this test when applied to commercial quinine sulphate, as will be seen from the following results with the sulphate above mentioned (II) which gave—

	Bisulphate test.	Crystalliza- tion test.	Oxalate test.
Cinchonidine sulphate.....	5·09	4·64	10·22

Evidently, therefore, the oxalate test is not less defective than the optical test in giving too high an indication of the amount of cinchonidine salt.

It has already been mentioned that the sample II containing 5·09 per cent. cinchonidine just passed the test given in the second edition of the German Pharmacopœia. With another sample I found that this test passed 7·2 per cent. On a former occasion, in testing according to my optical test a sample which only just passed the test given in the first edition of the German Pharmacopœia, my results in two experiments showed 12·92 and 13·02 per cent. cinchonidine sulphate, which appeared so questionable that I made further experiments with the bisulphate method and the tartrate method (Oudemans's optical test), and found by the former 8·46 per cent., but by the latter 15·7 per cent. cinchonidine sulphate. The cause of this high result—not altogether due to the presence of hydroquinine—was not clearly ascertained, but the experiment gives another illustration of the untrustworthy nature of the tartrate method.

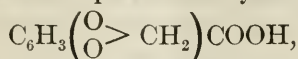
THE DISTRIBUTION OF SAFROL.

By PROFESSOR FLÜCKIGER.

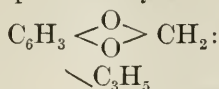
The prevailing constituent of the essential oil of sassafras root is *Safrol*, as will be seen in the text-books; for instance, in 'Pharmacographia,' second edition p. 536. In the crude oil, safrol is held in solution by the hydrocarbon safrene, $C_{10}H_{16}$, and may be separated either by fractional distillation or by cooling the oil. Safrol liquefies at 12° ($53^{\circ}·6F.$) and yields very large and fine prisms, which I caused to be exactly investigated crystallographically by Professor Arzconi, as mentioned in 'Pharmacographia.' The large crystals of safrol are very little softer than those of gypsum. Although they cannot be kept at a temperature exceeding their melting point, they

were, curiously enough known in England a century and a half ago.

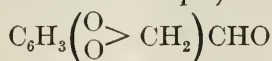
As to the constitution of saffrol it has been shown by Eykman¹ that by means of permanganate of potassium it yields piperonylic acid—



saffrol, therefore, may be represented by the formula—



Piperonylic acid is obtained by oxidizing piperonal (now known, in perfumery, under the name of heliotropin)—



and Poleck² thinks that he has observed piperonal among the products of the treatment of saffrol with permanganate of potassium, for the action of this salt on saffrol is by no means very simple, 4 per cent. of piperonylic acid only having been obtained by Poleck.

Sassafras is not the only plant containing saffrol. In the same natural order *viz.*, that of Lauraceæ, *Mespilodaphne Sassafras*, Meissner, a Brazilian tree, has a bark resembling saffrol in odor. The same is also well known with regard to the Puchury nuts, or sassafras nuts, the cotyledons of two Brazilian species of *Nectandra*, a genus as yet very imperfectly known.³

Again, the order of Monimiaceæ, tribe Atherospermeæ, closely allied to Lauraceæ, would appear to be provided with saffrol. Of this at least the aroma of the Australian 'sassafras bark' is strongly suggestive. This drug, which is not seldom seen in the London market, is the bark of *Atherosperma moschatum*, Labillardière, a tree indigenous to Australia and Tasmania. The bark of *Doryphora Sassafras* of New Caledonia, likewise of the order of Monimiaceæ—Atherospermeæ, also smells of sassafras.

Although there can be but little doubt as to saffrol really occurring

¹ *Recueil de travaux chimiques des Pays Bas*, iv. (1885), 32, according to the "Referate" of the *Berichte der Deutschen Chemischen Gesellschaft*, Berlin, 1885, p. 281.

² *Berichte der D. Ch. G.*, 1886, 1096.

³ See 'Pharmacographia,' 540. The statement found there to the effect that *Oreodaphne apifera* yields also an oil of the same odor is not correct, as I was informed in 1881 by a kind note from Mr. Holmes. "Aceite de Sassafras," from *Nectandra Cymbarum*, Nees, probably contains saffrol.

in all those essential oils of the just-named plants the fact has not yet been proved.

This, however, has been most surprisingly done by the well-known house of Schimmel & Co., of Leipzig, with regard to the oil of the camphor tree *Cinnamomum Camphora*. Since 1885 the said house is manufacturing safrol from camphor oil to a very large extent. No doubt there is now much more safrol being made in the state of absolute purity at Leipzig than they are able to distil crude oil of sassafras in the United States.

Cinnamomum Parthenoxylon, Meissner, and *C. glanduliferum*, Meissner, the former tree belonging to the forests of Penang, Sumatra and Java (Kayu-gadis of the Malays), perhaps also in Tennasserim; the second in Nepal, Sikkim, Bhootan and Khasia ("Sassafras of Nepal"), are also known for their odor resembling that of true sassafras.¹ They would deserve a chemical investigation.

I am struck, lastly, with the very strong odor of the same kind displayed by the bark of an Australian tree, which has been described by Bentham (assisted by Ferdinand Müller) in the 'Flora Australiensis,' vol. v. (1870), p. 299, under the name of *Nesodaphne obtusifolia*. It is a large and handsome tree, growing in Queensland, Rockingham Bay, Fitzroy River, Rockhampton, Archer's Creek (according to Leichhardt), also in New South Wales, Clarence River. Hooker and Bentham, 'Genera Plantarum,' iii. (1880), p. 152, ultimately unite the genus *Nesodaphne* to *Beilschmiedia*;² the tree under notice is, therefore, to be called *Beilschmiedia obtusifolia*, Benth. and Hook.

Dr. Joseph Bancroft, in his 'Contributions to Pharmacy from Queensland' (Colonial and Indian Exhibition of 1886, London), p. 11, states that the tree grows in the rich scrubs to the north of Brisbane. Its grey, rough bark, reddish-brown internally, has a strong aromatic odor and pleasant astrigent taste, and is frequently used by bushmen to improve the flavor of their tea. The bark, according to Mr. Staiger, affords about 2 per cent. of volatile oil heavier than water,³ and 9 per cent. of tannin.

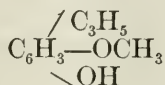
¹ Waring in 'Pharmacopœia of India.' London. 1868, 196.

² A genus of the order Lauracæ-Perseeæ, devoted by Nees to the Pharmacist Karl Traugott Beilschmied (1793-1848), of Ohlau, Silesia. See *Archiv der Pharmacie*, cviii. (1849), p. 126.

³ Specific gravity of safrol = 1.114 at 0° (32° F.)

Being indebted to Mr. E. Merck of Darmstadt, for a good sample of the bark of *Beilschmiedia obtusifolia*, I may state that it agrees to some degree, in its microscopic structure both with the bark of cassia lignea and sassafras. The *Beilschmiedia* bark is as much as 15 millimetres (half an inch) in thickness, and shows the same exfoliation due to secondary cork bands (rhytidoma) as the bark of sassafras. *Beilschmiedia* bark is, on the other hand, much more fibrous than either of the above-named barks; its tissue being very rich in long thin fibres, and in its outer layer there are scattered, not in large number, sclerenchymatous cells, having comparatively thin walls. The oil ducts of *Beilschmiedia* bark are neither very numerous, nor considerably large. It remains to be proved that they really contain safrol as I venture to say.

In the natural system, the Magnoliaceæ are not much distant from both Lauraceæ and Monimiaceæ. Eykman has shown,¹ that safrol also occurs in the essential oil of the fruit of *Illicium religiosum*, the false star-anise of Japan; this tree belongs to the order of Magnoliaceæ. There the safrol is accompanied by eugenol, the formula of which



at once reveals its relationship to safrol as also to anethol—



It would appear, therefore that at least eugenol $\text{C}_{10}\text{H}_{12}\text{O}_2$ and safrol $\text{C}_{10}\text{H}_{10}\text{O}_2$ may be in some generic relation. The former has been met with by Stenhouse in the leaves of the cinnamon tree.² And, thirdly, anethol $\text{C}_{10}\text{H}_{12}\text{O}$, the chief constituent of the oil of true star-anise, *Illicium anisatum*, is there replacing safrol as occurring in the other variety.

It would be interesting to be able to convert one into the other of those three highly aromatic substances; their empirical formulæ: $\text{C}_{10}\text{H}_{12}\text{O}$, $\text{C}_{10}\text{H}_{10}\text{O}_2$, $\text{C}_{10}\text{H}_{12}\text{O}_2$ would apparently indicate the probability of such transformations, but not their structure—*Phar Jour. and Trans.* June 4th, 1887, p. 989.

¹ *Pharm. Journ.*, xv. (1885), 985, short abstract of Eykman's paper in the *Recueil*, above mentioned.

² 'Pharmacographia,' 527.

ON NAPHTHALOL.

BY R. KOBERT.

SALOL, introduced by Nencki, (see *AM. JOUR. PHAR.* 1880, pp. 380, 552,) is rather poisonous, because it contains 38 per cent. phenol. Merck has prepared a substance of the formula $C_6H_4OH \cdot CO \cdot OC_{10}H_7$, named naphthalol or naphtholsalol. It is an ether-like compound like ordinary salol; instead of the poisonous phenol it contains β -naphthol, which is relatively non-poisonous. Kobert has made experiments with it on animals and man, to determine its physico-chemical behavior and its effect on the digestive ferments. He has arrived at the following conclusions:—

(1) The drug is insoluble in water, odorless, tasteless; it is not dissolved or decomposed by acids, gastric juice, nor by pepsin.

(2) It is quickly decomposed by the pancreatic and other ferments which are produced by the living mucous membrane of the small intestine, as shown by experiments on rabbits, dogs, calves, oxen, rats, and sheep. Phenolsalol, according to Nencki, is decomposed by the pancreas.

(3) The mucous membrane of the cœcum and vermiform process of animals acts on the drug in a similar manner.

(4) The mucous membrane of the colon also decomposes it, although to a less extent.

(5) The stomach is not affected by the drug.

(6) Doses of .3 to .5 gr. daily cause no disagreeable general symptoms, no noises in the ear, fullness of the head, and such as are occasionally produced by the phenolsalol.

(7) In man, naphtholsalol after administration by the mouth appears in the urine in the same form as salicylic acid, viz., as a body which becomes of a violet color in contact with perchloride of iron.

(8) No symptoms of poisoning were observed, even after several weeks' administration of the above-mentioned doses.

(9) Animals can bear much larger doses without the general condition being injuriously influenced. A hen was not ill after having three grains within two days.

(10) The drug was found very useful, and at least as valuable as other medicaments, in various forms of catarrh of the bladder, especially in gonorrhœal cystitis, with alkaline decomposition of the urine. The urine soon became clear and acid, the formed elements in it were diminished in number, and the pains of the patients became easy.

(11) The drug seems to be borne as well and acts better than phenolsalol in acute articular rheumatism.

(12) The further use of naphtholsalol in various forms of decomposition in the intestine seems quite feasible.

(13) Small quantities of naphtholsalol do not permanently protect urine, meat infusion, and foul-smelling fluids against decomposition as phenolsalol does. For urethral injection the latter, therefore, is to be preferred. The advantage of naphtholsalol consists chiefly in its relative non-toxicity when used internally. Willenz will publish details in his inaugural dissertation.—*Med. Chronicle* 1887, p. 304; *Ther. Monatshefte*, May.

VEGETABLE GLOBULINS.

BY S. H. C. MARTIN.¹

Vegetable globulins can be divided into two classes, namely, vegetable myosins and vegetable paraglobulins. The myosins, obtained from the flour of wheat, rye, and barley, have similar properties; they are all readily soluble in 10—15 per cent. sodium chloride solution, and are precipitable from this solution by saturation with sodium chloride or magnesium sulphate. They are soluble in 10 per cent. magnesium sulphate solution, and are coagulated in this solution at a temperature of 55—60°. If the salt is dialysed away from the saline solution of myosins, the latter is precipitated; but the precipitate is no longer a globulin, since it is insoluble in saline solutions. It is soluble in dilute acids and alkalis (0.2 per cent.); it is precipitable from these solutions by neutralization, the precipitate being soluble in excess of alkali or acid; that is, the myosin has been converted into a proteid, having the properties of an albuminate. If the saline solution of myosin be placed in an incubator at a temperature of 35—40°, in 12 to 18 hours a fine flocculent precipitate falls, while the globulin disappears from the solution; this takes place more rapidly if the saline solution is diluted. The precipitate exhibits the same properties as the precipitate of the globulin by dialysis; that is, at a temperature of 35—40° the globulin is transformed into an albuminate. The ready transformation of the soluble globulin of wheaten flour into an insol-

¹ *Proc. Physiol. Soc.*, 1887, 8—9. Reprinted from *Jour. Chem. Soc.*, May 1887, p. 507.

ble albuminate is one of the phenomena which takes place during the formation of gluten.

The second class of vegetable globulins, the paraglobulins, is in distinct contrast with that of the myosins. Two proteids of this class have been found, one in papaw juice, the other in the seeds of *Abrus precatorius* (jequirity). Both these globulins exhibit the following properties: they are soluble in saline solutions, and are precipitated by saturation with sodium chloride and magnetium sulphate. In a 10 per cent. solution of magnesium sulphate, they coagulate between 70° and 75°. When precipitated from their saline solutions by dialysis, they are still soluble in solutions of sodium chloride and magnesium sulphate of 10—15 per cent., not being transformed into albuminates. Nor are they precipitated by long exposure (over three days) to a temperature of 35—40°.

CHARACTERISTICS OF OLIVE OIL.

A. Levallois (*Compt. rend.*, civ, 371—373), has examined a large number of genuine samples of olive oil from the olive yards of the south-east of France.

The color of the oil was determined by means of a Duboscq colorimeter. The color at the commencement of a crop is 70 times as intense as at the end. The sp. gr. at 15° varies from 0.9167 to 0.9177, and the differences observed with different species are only very slight. The sp. gr. of olive oil at 24° is 0.911, whilst that of other oils at the same temperature is as follows:—

Sesame.....	0.917	Colza.....	0.910
Cotton-seed	0.9165	Camelina.....	0.920
Earth-nut.....	0.912	Linseed	0.928
Poppy.....	0.9205		

The sp. gr. of colza and earth-nut oil are somewhat near that of olive, but their other properties make it easy to distinguish between them.

Cailletet's reagent (nitric acid saturated with nitrogen oxides) usually gives a green coloration, which, however, is not always pure, but is sometimes mixed with yellow.

Andoynaud's reaction (addition of nitrosulphuric acid and ether to a mixture of the oil with potassium dichromate) usually gives a green coloration, which in some cases is mixed with yellow.

The determination of the non-saturated fatty acids by treating the non-saponified oil with bromine or iodine gave no concordant results. The following method is satisfactory :—5 grams of the oil are weighed into a test-tube about 15 cm. long and 15 mm. diameter, mixed with 10 cc. of a 20 per cent. solution of potassium hydroxide in alcohol of 93°, and agitated, when the oil dissolves. The liquid is then heated on a water-bath to a temperature sufficient to produce gentle ebullition, and after about 15 minutes saponification is complete. The volume of the liquid is then made up to 50 cc. by adding alcohol, and 5 cc. of the solution is placed in a tube provided with a glass stopper, acidified with hydrochloric acid, and then mixed with a concentrated aqueous solution of bromine from a burette, with vigorous agitation, until the liquid acquires a persistent pale-yellow tint. About 0.1 cc. of solution is required to produce the end reaction, and this should be subtracted from the total volume added. The bromine is standardized by means of a decinormal solution of arsenious acid, mixed with hydrochloric acid. Different samples of oil from the same species of olive absorbed from 0.512 to 0.522 gram of bromine per gram of oil. The absorption by oil from different species of olive varied from 0.500, to 0.544, the last result being obtained with oil from Blanquetier which also has an exceptionally high sp. gr. The amount of bromine absorbed by 1 gram of other oils is as follows :—

Cotton-seed.....	0.645	Colza.....	0.640
Sesame.....	0.695	Camelina.....	0.817
Earth-nut.....	0.530	Linseed.....	1.000
Poppy	0.835		

The alcoholic solution of soap from oil of earth-nut becomes solid as soon as the temperature falls to 15°, but the corresponding solution of olive oil soap remains liquid.

The most constant characteristic of oil soap is its sp. gr., but the determination of the bromine absorbed is also very useful.

T. Leone and A. Longi (*Gazzetta*, xvi, 393—398), with a view to the recognition of the presence of sesame and cotton oils in cases of sophistication of olive oil, have examined the physical and chemical properties of these oils, such as the proportion of solid acids obtained on saponification, the quantity of alkali required to complete this process, the specific gravities at 100° of the oils and the resultant acids, the points of fusion and solidification of the acids, and the indices of

refraction of the oils. As a result of their examination, it follows that the quantities of solid acids and of alkali required for saponification are appreciably equal for all three oils, but the sp. gr. of olive oil at 100° is less than that of sesame and cotton oils by about 0·005, the index of refraction of the former is also somewhat less than those of the latter. But the most marked difference is observed in the points of fusion and solidification of the resultant acids, for those from olive oil melt at 24—27°, and begin to solidify at 17·5°, whilst those from cotton and sesame oils melt at 36—40°, and solidify at 34—30° and 34—32° respectively.—*Jour. Chem. Soc.*, May 1887, 535, 536.

INVESTIGATIONS ON STROPHANTHUS.

From a paper by Mr. Wm. Elborne, published in *Phar. Jour. and Trans.*, March 12, 1887, p. 743, we make the following extracts:

Strophanthus was introduced by Prof. Fraser, his researches having reference to the seeds of the Kombé arrow poison (See *AMER. JOUR. PHAR.*, 1886, p. 405). From these seeds Fraser isolated a crystalline bitter glucoside, which he named strophanthin. From *Strophanthus hispidus*, *DeCand.*, Hardy and Gallois subsequently isolated a crystalline bitter principle, neither of a glucosidal nor alkaloidal nature, but possessing all the toxic properties of Fraser's glucoside, which they termed strophantine (*AMER. JOUR. PHAR.*, 1877, p. 402). The botany of the subject is by no means at present sufficiently clear to enable pharmacists to distinguish with precision the one from the other, and it appears to be questionable whether poisonous seeds, possessing undoubtedly the physiological activity described by Fraser, may be here and are not collected from species other than the two already experimented upon by the above gentlemen. Prof. Oliver has stated that the fruits entirely correspond in the two species; it is, however, generally accepted that the follicles yielding seeds with greenish-brown hairs, belong to the Kombé plant, whereas those yielding seeds with brown hairs, belong to the *S. hispidus*, and Prof. Oliver, after a more minute examination, referred the former to a distinct species which he named *Strophanthus Kombé*. This plant is described as follows by Dr. Kirk, Consul at Zanzibar:

"The plant is a woody climber, growing in the forest both of the valley and the hills, and found at various places between the coast and

the centre of the continent above the Victoria Falls and the Zambesi. The stem is several inches in diameter and rough outside. The plant climbs up the highest trees and hangs from one tree to another like a bush-vine. The flowers are of a pale yellow, and last for but a short time during the months preceding the first rains of the season. (Oct. and Nov)."

The fruit is ripe in June; the natives separate the rough epicarp and mesocarp, and dry the endocarp containing the seeds; hence the tawny appearance of the commercial follicles.

The method adopted by the natives in poisoning their arrows, is as follows: Before extracting the seed from the fruits, they dig a hole in the ground, so that they can bury the comose hair attached to the seed (for fear of its flying in their eyes), they then coarsely grind the seed, and mix it into a paste, which latter constitutes the poison with which the arrows are smeared. Game wounded by an arrow thus poisoned dies at once, seldom being able to move a hundred yards. The flesh

is eaten without any evil effect accruing. The only precaution is to squeeze the sap out of a branch of the baobab tree into the wound made by the arrow, which is said to mitigate any evil effect that might result from the poison being more plentiful in the vicinity of the wound.

The drug examined by Mr. Elborne had been presented by Mr. T.



Christy, and was collected in East Africa. Mr. E. M. Holmes found it to correspond with that from Lake Nyanza, which is referred to *Str. Kombé*. The seeds of *Str. hispidus* are chestnut-brown. The hairs on the seed are quite deciduous, and the comose appendages are white. One of the pods, 12 inches in length, weighed 14.069 gm., and yielded seeds 5.99 gm. (42 per cent.); comose hair 3.119 gm. (22 per cent.), and endocarp 4.96 gm. (35 percent.)

On submitting the seeds to analysis, petroleum ether dissolved 20.8 per cent. of a bright yellow oil, having a tinge of green, free from bitter taste, and in a few days depositing some colorless crystals which were fusible, and on ignition left no ash. Absolute ether took up 0.9 per cent. of chlorophyll and fat, and the extract was free from bitterness. The absolute alcohol extract, after treatment with charcoal, was obtained in transparent scales weighing 1.5 per cent.; it was soluble in water, imparted bitterness to 380.000 of water, did not react with alkaloid reagents, was not precipitated by lead acetate, and did not reduce Fehling's solution until it had been boiled with dilute sulphuric acid. Cold distilled water extracted 22.5 per cent. of extract, which when dissolved in little water and poured into a large quantity of a mixture of alcohol and ether, precipitated albuminous matters, and by evaporation of the filtrate yielded an additional quantity of 2.9 per cent. of bitter principle, identical with the preceding in appearance, behavior and physiological action. The matter not dissolved by the foregoing treatment weighed 54.3 per cent. According to L. Larmuth, the bitter principle on being dissolved in water will, in a few days, undergo some change, and become far more toxic than when recently prepared.

The comose hairs yielded to absolute alcohol 0.68 per cent. of brown extract, from which water dissolved a very small amount of slightly bitter matter, not acted upon by alkaloidal reagents. The resinous residue was insoluble in ether; its alcoholic solution had a bitter taste, and dropped into water produced a beautiful blue fluorescence. The aqueous extract of the hairs was free from bitterness.

The endocarp gave with absolute alcohol 1.3 per cent. of extract, yielding with water a slightly bitter solution, free from tannin and not precipitated by Mayer's solution.

The root, freed from the cortical portion, excited sneezing when powdered, and yielded to ether 0.7 per cent. of caoutchouc-like substance; to alcohol 1.1 per cent. of an intensely bitter substance giving

the reaction for a glucoside; and to water 7.67 per cent. of a very bitter extract, which has not yet been examined.

H. Helbing (*Phar. Jour. and Trans.*, March 12, 1887, p. 747), has found the quality of the Kombé seeds to vary considerably; the best are 15 to 25 mm. long, and 4 to 5 mm. broad, somewhat rounded at the base, narrowed at the apex and prolonged into the stalk of the hairy crown, somewhat twisted lengthwise, flattened, on one side with a much more prominent keel-like ridge than on the other, of a grayish-green to brown color, and covered with appressed silvery silky hairs; 100 seeds weigh about 62 grains. Another variety of seeds is similar to the preceding in shape, but densely covered with loose, longer, silky, white hairs like a fur; 100 seeds weigh about 57 grains. The least heavy of the commercial strophanthus seeds have a dusky, dirty color, the kernel is not white, the hairs of the crown are dingy yellow, and 100 seeds weigh about 33 or 34 grains.

On drying the Kombé seed at 120° F. they lose upwards of 5 per cent. of moisture, and give with ether 32.45 per cent. of dark green fixed oil, sp. gr. .925, and becoming brownish-red when heated on the water bath. The white strophanthus seed yielded 23.33 per cent. oil, which was a little paler in color, but otherwise like the preceding.

Mr. Helbing likewise found that the seeds freed from oil cannot be completely deprived of bitterness by the use of rectified spirit sp. gr. .838. A tincture thus prepared is of a very pale color, has the sp. gr. .840, and a fluid ounce of it yields about 120 mgm. of residue on evaporation. Three commercial tinctures had nearly the same density, but yielded respectively 88, 124 and 180 mgm. of residue. Four other tinctures were probably made with a weaker alcohol, were of a green or yellow color, varied between .870 and .900 in density, and yielded from 170 to 242 mgm. of residue.

H. D. Rolleston, B. A., (*Ph. Jour. and Trans.*, March 19, 1887, p. 761), observed that the ethereal extract of the seed gave with distilled water a solution, which on being filtered from the oil, had a bitter taste and the physiological effects of strophanthin. Similar results were obtained with the ethereal extract of strophanthus seeds prepared by different experimenters from white and green strophanthus seeds with absolute ether, showing that strophanthin is soluble in ether when the oil is present, and that the ethereal extract is not without value.

A. W. Gerrard, (*Ph. Jour. and Trans.*, May 14, 1887, p. 923), obtained from strophanthus seeds by treatment with petroleum spirit, 31

per cent. of green fixed oil, and on subsequent treatment with 84 per cent. alcohol, 52 per cent. of extract. Using upon various samples of seeds successively petroleum benzin, ether and absolute alcohol, the latter yielded 5 per cent. of extract, or considerably more than had been obtained by Elborne. The alcoholic extract may be obtained without the costly process of percolation with ether; on boiling the ground seeds with alcohol, and distilling and evaporating the tincture, about 5 per cent. of hard extract is obtained, from which the 31 per cent. of oil can be easily poured off, and adhering traces be washed away with very little ether. Elborne's results of the absence of an alkaloid, ineine, from the comose hairs are confirmed.

Strophanthin was prepared from the alcoholic extract, by dissolving it in water, filtering, adding excess of tannin, washing the gray precipitate with warm water, mixing with excess of lead acetate, drying the mixture, exhausting it with warm alcohol, removing lead by H_2S , filtering and evaporating. Thus obtained, strophanthin is pale yellowish, amorphous, readily pulverizable, burns without residue, dissolves freely in water and alcohol, and is insoluble in absolute ether or chloroform. The watery solution, when shaken, gives much froth; warmed with silver nitrate the latter is reduced; tannin causes a white precipitate; on boiling with dilute sulphuric acid glucose is produced.

Helbing (*ibid.* p. 924), had observed that concentrated sulphuric acid dissolves strophanthin, changing the color to dark green and finally dark reddish-brown. Minute traces of strophanthin may be detected by dissolving in a drop of water, adding a trace of solution of ferric chloride, and then a little concentrated sulphuric acid; a reddish-brown precipitate is formed which in the course of an hour or two turns emerald-green or a little darker-green, and this color remains unchanged for a long time.

Dr. F. F. Hanausek has published (*Phar. Post*, May 8, 1887, p. 301), a description of *strophanthus* seeds, from which the following abstract is made: Length of the seed 15 to 20 mm., width 4 mm., thickness about 1 mm., base rounded, apex attenuated to point which is prolonged into an awn almost 9 cm. long, the upper third of which is on all sides beset with delicate silky fragile hairs about 6 cm. in length. Seed yellowish-white, covered feltlike with soft silky hairs. The transverse section shows under the wrinkled testa a thin endosperm and two nearly plano convex cotyledons, the latter constituting the

greater part of the seed. The section treated with potassa shows the testa colored golden-brown, the albumen colorless, and the cotyledons greenish or canary-yellow. Concentrated sulphuric acid colors the hairs and testa golden-brown, the albumen emerald-green, and the cotyledons yellow, changing successively to greenish, bronze-colored, coppery and finally almost blood-red. It appears from the reactions that the albumen contains principally fixed oil, and the embryo besides fat also strophantin.

A false *strophanthus* seed has been examined by Mr. E. M. Holmes (*Phar. Jour. and Trans.*, May 7, 1887, p. 903), and shown to be the seed of *Kieksia africana*, *Bentham*, which grows on the Bag rooriver, at Fernando Po and at Bonny, in open low country, and is the only known African species. The seed is without awn, but is attached to the long hairy funiculus, which resembles a retrorsely hairy awn. On transverse section the cotyledons are seen to be folded or contortuplicate. Prof. Birch isolated from the seed a toxic principle, which is not a glucoside, but most likely an alkaloid. Prof. Kieckx, after whom the genus is named, was director of the Botanic Garden at Ghent, and president of the Botanical Society of Belgium, and died March 20, 1887.

These seeds, as figured by T. Christy (*New Commercial Plants*, part 10), are pointed at both ends, somewhat bent, not hairy, but the retrorse hairs of the funiculus project beyond the apex of the seed.

Other *strophanthus* seeds are also figured and described by Christy. The seed of *Str. hispidus*, *DeCand.*, are smaller than Kombé seeds, dark brown, short-hairy, the bare awn rather short. *Str. dichotomus* var. *Marekii*, *DeCand.*, from Java, has the seed rounded, but narrowed at the base, dark-brown, flat, slightly bitter; bare awn short, brown, the hairy portion paler and the hairs long. The seed of an unknown species, resembles Kombé, but is larger, gray-green, has a much longer awn, and is very bitter. Another seed from the Gold Coast is pale-brown, scarcely bitter, the awn and awn-hairs rather short.

The seed of *Str. Ledienii*, *Stein*, (*Gartenzeitung*, 1887, p. 146; see also *AMER. JOUR. PHAR.*, 1887, p. 269), is of the shape and size of a wheat grain, densely covered with silky yellowish-brown hairs, and at the apex provided with an awn, which is about 2 cm. long, and from its base beset with hairs, the total length of the comose appendage being about 5 cm.

J. M. M.

GLEANINGS IN MATERIA MEDICA.

BY THE EDITOR.

Huechys sanguinea, a hemipterous insect, appeared recently in the London market as "Chinese cantharides." John Moss describes it (*Phar. Jour. and Trans.*, April 16, 1887, p. 845) to be from $\frac{12}{16}$ to $\frac{15}{16}$ inch long, with a vermilion-red abdomen and a dull blackish-brown thorax and wing cases. The insect has large and prominent eyes, two large vermilion cordate spots behind the head, and a keel-like protuberance of the same color between the eyes, but rather below them. It has the smell of cantharides, but did not yield cantharidin, nor could a vesicating preparation be made. The acetic ether extract, treated with carbon bisulphide, left 2.495 per cent. oily matter undissolved, which acted merely as a mild rubefacient.

Arginine is an alkaloid which has been isolated by E. Schulze and E. Steiger from the germinated seeds of *Lupinus luteus*, *Lin.* A hot water infusion of the dried and powdered cotyledons is mixed successively with tannin, lead acetate and lead subacetate, the filtrate freed from lead by sulphuric acid, again filtered and precipitated with phosphotungstic acid; the precipitate is mixed with lime and a little baryta; the filtrate freed from these bases by carbonic acid gas, is neutralized with nitric acid and evaporated to crystallization. The isolated base was not obtained in distinct crystals; it is easily soluble in water, insoluble in alcohol, has the composition $C_6H_{14}N_4O_2$, and readily absorbs carbonic acid forming a crystallizable carbonate soluble in water. Most of the salts are readily soluble in water, and these solutions dissolve cupric hydrate, yielding crystallizable salts containing copper and arginine. The solutions of arginine salts are precipitated by phosphoantimonic acid, phosphotungstic acid and potassio-bismuth iodide, but not by picric acid, tannin, or the double iodides of mercury or cadmium.

Besides the alkaloid the young plants contain also asparagin, glutamin, leucine, tyrosine, amido-valerianic acid and phenylamido-propionic acid, which are doubtless formed from the albuminoids.

Recently germinated blanched pumpkin plants contain likewise arginine, but in smaller proportion than the above.

Pipi root, which attracted some attention in Europe sixty years ago, and was then described by Ach. Richard, (*Jour. Chim. Méd.*, Jan. 1829), has again made its appearance in the European market, and is

referred to *Petiveria hexaglochin*, *Fischer*, nat. ord. *Phytolaccaceæ*. It is described, (*Chem. Zeit.*, 1887, p. 348,) as consisting of irregularly bent pieces, 3 to 6 mm. ($\frac{1}{8}$ - $\frac{1}{4}$ inch) thick, externally gray-brown, upon transverse section showing a brownish bark with white dots, and a lighter colored radiating ligneous cord. The cork-layer consists of 3 or 4 rows of cells; the comparatively thick primary bark contains a number of enlarged cells, enclosing one or two large, or many small, crystals of calcium oxalate; the woody cord contains tracheïds with narrow dotted ducts, two-rowed medullary rays, and in the centre a thin pith. The root is recommended as an emmenagogue.

The genus *Petiveria* is confined to tropical America, and the shrubby or suffruticose plants are mostly acid and have, particularly in the root, an alliaceous odor. Richard referred pipi root to *Pet. alliacea*, *Lin.*, and Martius (*Buch. Rep.*, 1824, xvii., p. 175), to *Pet. tetrandra*, *Gomez*. The root has been used internally and in baths and fomentations, as a diaphoretic, stimulant, expectorant, anthelmintic, and in fevers, toothache and gonorrhœa.

VARIETIES.

Boracin.—Dr. Thornton Parker states that this compound consists of boric acid, glycerin, methyl salicylate, menthol, thymol and eucalyptol. Used in solution, it is a satisfactory dressing for wounds; as a thick paste it is well adapted for the treatment of chronic ulcers of the legs. In the form of suppositories made with glycerin, and containing 55 per cent. of boracin, it forms a convenient method of treating threadworms or chronic leucorrhœa, while an ointment of it has given excellent results in the treatment of chronic eczema of the scalp.—*Quart. Review*, April, 1887.

Action of bitters.—From experiments performed recently in St. Petersburg, Prof. Botkin asserts:

1. That bitters diminish the digestive power, and retard digestion; they diminish the quantity of peptones.

2. That bitters diminish the secretion of the gastric juice. If they produce a feeling of hunger, it is only by irritating the gastric mucous membrane.

3. Bitters have no influence upon the secretion of the pancreatic juice or the bile.

4. Bitters not only do not diminish, but actually promote fermentation in the contents of the stomach.

Conclusion. The bitters are not of any use in the treatment of disorders of digestion.—*L'Union Médicale du Canada*.

EDITORIAL DEPARTMENT.

The *Pennsylvania State Pharmaceutical Examining Board* held its first meeting at the Lochiel Hotel, Harrisburg, July 12th, and organized by the election of Alonzo Robbins, Philadelphia, as president; Harry B. Cochran, Lancaster, as secretary, and Fred. H. Eggers, Allegheny City, as treasurer. The necessary preparations were made for active operations. Notice of the time for registration will be given through several newspapers, and blank forms of application for registration will be mailed, with a copy of the law, to every druggist in the State whose address is known. The first examination will probably be held in the fall.

American Pharmaceutical Association.—The Committee of Arrangements for the next meeting, to be held in Cincinnati, September 5th, has completed all the preliminary arrangements. To secure the *reduction of railroad fare* members must pay full fare going, purchase the ticket not earlier than September 2d, and obtain from the ticket agent a certificate to that effect; attendance at the meeting having been certified to by the secretary of the association, return tickets over the same route may be obtained, at one-third the highest limited fare, within three days after adjournment, and such return tickets will be for continuous trips without stop-over. Arrangements for traveling parties from Boston have been made by Mr. J. W. Colcord, Lynn, Mass., and from New York by Mr. T. J. Macmahon, New York city.

The *Headquarters* will be at the Grand Hotel, but arrangements for good accommodations have been made with several hotels, and a blank slip will be mailed by the local secretary, Mr. G. W. Voss, who will secure rooms upon its return. The hotel rates are: Grand Hotel, Gibson House, and Burnet House, \$3; Palace Hotel, \$2 to \$2.50; St. James Hotel and Dennison Hotel, \$2. European plan: St. Nicholas, \$1.50 and upwards, and Hotel Emery, \$1.

The committee was unable to obtain exhibits enough for a successful exposition, and no arrangements for such have, for this reason, been made.

The *entertainments* contemplated are a reception and promenade concert at the Grand Hotel on Tuesday evening Sept. 6th, tendered by the druggists of Cincinnati; Wednesday evening a vocal, instrumental and organ concert at Music Hall, under the auspices of the Apollo Club, comprising 40 male voices; Friday, carriage drive through the city and suburbs, visiting Eden Park, the West Museum of Art, Walnut Hills, Avondale, Clifton and the Zoological Garden, where a banquet will be held. If desired, members may leave for home by evening trains. Visiting ladies will be entertained by the local Committee of Ladies.

The following *excursions* have been provided for from Cincinnati: To the Mammoth Cave, at 8.15 A. M., or 8 P. M., in 9½ hours; round trip, \$13.75—for 25 or more \$7.85; hotel \$3 per day; cave, short route (8 miles) \$2; long route (16 miles) \$3; suitable reduction to a party.—To High Bridge on the Cincinnati Southern R. R., round trip \$5—; for five or more \$3—and on Sundays \$2.—To Findlay, Karg Gas Well, having a capacity of over 15 mil-

lion cubic feet per day, and other wells over 8 million cubic feet; for parties of ten or more the round trip for one fare.—To Dayton Soldier's Home, for ten or more \$2.50 the round trip.

Poisoning by chromate of lead.—Startling developments were recently made in Philadelphia, after a physician had traced several cases of lead poisoning to the buns eaten by the patients, or rather to the egg-color used by the baker to give a rich appearance to his cakes and buns. The baker, Palmer, himself was suffering from the same cause, likewise his wife, while his first wife and six children had died presumably from the effects of this poison. Eleven fatal cases have been ascertained, and an inquest having been held on four of the victims, the use of chrome yellow as an egg color was proved; also the presence of lead in the viscera determined by chemical analysis. The verdict was in accordance with the facts proven, and the baker was held to await the action of the grand jury. Suits to recover damages for sickness and death have also been entered against several parties charged with adulterating and selling adulterated articles of food and with selling poisonous coloring-matter. The full extent of these criminal adulterations is as yet not known; but it has been asserted that chrome-yellow had been used by a number of bakers, noodle manufacturers and confectioners. Many of the products sold by the latter are required by the public to be of bright colors, for which, however, non-poisonous substances are most likely employed to a much larger extent. In fact it is to be hoped that a full investigation may show that the fraudulent use of poisonous coloring matter is the rare exception, and not the general rule.

OBITUARY.

Professor Jean Baptiste Joseph Boussingault died in Paris, May 12th. He was born in 1802, devoted himself in his studies chiefly to chemistry and mineralogy, and subsequently traveled for several years in the northern and western regions of South America. On his return to France, in 1833, he was called to the Chair of Chemistry in the College of Lyons, and a few years later accepted a call to Paris as Professor of Agricultural Chemistry, to which branch his later scientific researches were mainly devoted. The earlier volumes of the *American Journal of Pharmacy* contain a number of his papers, embracing investigations from both his fields of labor in Lyons and Paris, the latter being of particular importance and simultaneous with similar researches by Liebig, Dumas and others in physiological and agricultural chemistry.

Frederick Wolfrum died in Augsburg, May 15. He was born in Hof, Bavaria, September 22, 1818, and, after finishing his apprenticeship in pharmacy, studied for two years at the University of Munich, passing the State's examination in 1840. He established himself in business in Kaufbeuren, and

subsequently in Augsburg, where he also commenced the manufacture on a large scale of certain pharmaceutical preparations. For many years he was Presiding Director of the South German and later of the German Apothecaries' Society. He was also a member of the commissions for the elaboration of the two editions of the German Pharmacopœia which have thus far been published.

Joseph C. Kirkbride, Ph. G., a prominent pharmacist of St. Louis, Mo., and President of the St. Louis College of Pharmacy, died in that city of apoplexy May 6th, at the age of 47 years. He was an apprentice of J. C. Delacour, Camden, N. J., graduated from the Philadelphia College of Pharmacy in 1863, and entered into business in St. Louis in 1867.

Professor Carl Damian Ritter von Schroff died in Graz, Styria, June 17, in the eighty-fifth year of his age. He was born at Kratzau, Bohemia, September 12, 1802, where for two hundred years his ancestors had been practising physicians. He was educated at the classical school (Gymnasium) and at the University of Prague, and in his studies paid particular attention to the ancient languages and to natural history, besides the usual medical branches. He graduated as doctor of medicine in 1828, and at once became resident physician of the new Insane Asylum at Prague, and was for several years clinical assistant of Prof. Krombholz. In 1830 he was called to the chair of Theory of Medicine in the University of Olmutz, and in 1835 to the same chair in the University at Vienna. In 1849 he was transferred to the chair of General Pathology and Pharmacology, and occupied also the chair of Pharmacognosy, then newly created for the education of pharmacists. In the following year he was also appointed a member of the Medical Commission attached to the Department of the Interior, and subsequently of the Sanitary Council. He took an active part in the revision of two editions of the *Austrian Pharmacopœia*, and in 1865 was President of the Arrangement Committee for the celebration of the five-hundredth anniversary of the University of Vienna. In 1874 he retired from active life, and some years afterwards moved to Graz, where his son Carl is professor at the University.

Schroff wrote a very large number of essays on subjects of *materia medica*, embracing his investigations on the characteristics, composition and physiological action of many drugs, and various toxicological studies; those possessing chiefly pharmaceutical interest were mostly published in the Journal of the Austrian Apothecaries Society, and five or six of them were republished in a condensed form in the *AMERICAN JOURNAL OF PHARMACY*, 1860 to 1870. Among the larger medical works his "Pharmacology" is perhaps best known; it contains the results of Prof. Schroff's physiological studies, while his valuable "Pharmacognosy" was primarily intended for the use of pharmacists. Both these works passed through several editions. In his reports on the drugs at the Paris Exposition in 1867, and at the Vienna Exposition in 1873, will be found a large amount of information of permanent value.

The deceased was a member or honorary member of a large number of scientific societies; for nearly twenty years he was an honorary member of the Philadelphia College of Pharmacy.

THE AMERICAN JOURNAL OF PHARMACY.

SEPTEMBER, 1887.

SOME REMARKS ON GRAPE CULTURE.

BY HENRY SNYDER MAUGER, PH.G.

(From an Inaugural Essay).

It is well known that in some localities many of the best varieties do not succeed solely on account of their foliage being destroyed more or less by mildew, and the criterion of a useful grape depends solely upon its freedom from mildew on the leaves, and not on account of the flavor or other good qualities of the fruit; so we find that the most popular varieties are not those of the highest merit in flavor, but those that are least affected with mildew on the foliage and fruit. The most prevalent form of mildew on the leaves of our native grapes is known as *Peronospora viticola*, Berk. This is always found on the under surface of the leaf; it commences in small spots of a brownish color which adhere closely to the leaf ribs, and when the conditions are favorable it spreads rapidly and destroys the vitality of the part attacked. Its presence is made apparent by a yellowish tinge which may be seen on the upper surface of the foliage, and in clear weather these spots become brown-colored, afterwards crisp and dry, and ultimately the leaf is more or less destroyed. This appearance on the foliage is sometimes termed sun-scald, but it hardly need be stated that the leaves would not be injured by the sun were it not that their vitality is impaired by mildew; yet we frequently meet with cultivators who maintain that their vines are free from mildew, while they admit the foliage is scalded by the sun and drying off.

By the time its effects are thus visible the mildew is not so easily discerned, or it may have run its course and left but little evidence of its presence in an active state, and this may be the reason why many grape-growers show so little knowledge of the disease. Hence the

origin of so many seemingly conflicting opinions relative to the exemption of varieties of grape from mildew, owing to the effects produced by this disease being attributed to other supposed causes.

It is a disputed question whether or not mildew will attack perfectly healthy vegetation. By many persons it is held that fungoid growths only appear on disorganized vegetable or animal matters; that, previous to the appearance of the mildew on leaves, some disturbing cause has been at work on the plant, and the partial decomposition which has resulted from the unhealthy state forms proper conditions for the development of the fungus. From this reasoning it follows that, previous to the appearance of mildew, there must exist a disorganization of vegetable tissue; and before a remedy can be suggested we must first endeavor to discover the cause of the incipient disease which allows the development of the fungoid growths.

The peronospora is never found on grape-leaves which are always dry. The predisposing cause of this particular species of fungus is an excess of retained moisture on the foliage, either from continued wet and damp weather, or from heavy night dews succeeded by calm days. Grape-vines trained on trellises protected by a covering at top, so as to prevent the radiation of heat from, and the consequent deposition of dew upon, the surfaces of the leaves are never troubled by this fungus.

It is also a common observation that grape-vines growing through and over trees are never seriously injured by mildew, the protection afforded by the leaves of the tree preventing it. Branches from the same root, some of which are allowed to ramble over a tree, and others trained upon an ordinary trellis, will afford good examples as to the benefits of protection in preventing mildew. Hence it may be inferred that a good locality for vineyards is one where there is exemption from late spring frosts, from late dews during summer nights, and from early frosts in autumn; and the best results will be found where all these conditions exist, and failures will follow in proportion to their deficiency. So far as concerns entire freedom from the mildew under consideration, the conditions are found on sloping hillsides contiguous to well-defined valleys. It has long been observed that in clear, still nights during summer, dews are less frequent upon the sides of hills than they are in the neighboring valleys.

The appearance of hoar-frost in valleys during the early winter and spring seasons is produced by conditions of temperature similar to

those which cause the heavier deposition of dews in these localities. During clear nights currents of cool air run downwards on the inclined lands to the bottom of the valleys. These currents are the result of the sudden depression of temperatures sustained by the surface of the earth in consequence of rapid radiation, by which the stratum of air in immediate contact with that surface becomes specifically heavier by condensation, and descends into the valley, which then rapidly cools, while the warm air of the valley is lifted up, and impinges on the sides of the hills, and so far as this warm stratum extends there is no condensation of moisture such as occurs in the low grounds in the form of heavy dews in summer, and which in cool weather freezes and becomes hoar-frost. The effects of this stratum of warm air upon vegetation on hillsides is very well defined where early autumn frosts have destroyed the foliage of the trees below a certain line, which is sometimes called the vernal line, or line of no frost; above this line, and within the limits of the extent of the warm stratum or zone, vegetation is unharmed. The altitude to which this line reaches above the bottom of the valley is dependent upon the mean temperature of the day and night, or rather upon their comparative difference at the time of its occurrence; when the temperatures of both are high, the lower places only are affected by the frost, but when low, the frost will extend higher up on the hills. If we consider the climate conditions of localities where grapes do well, we will find that they are those which are nearly exempt from dews, and, as a consequence, all varieties of grapes retain their foliage during summer. In other words, the distinguishing peculiarity of a good grape climate is that of the entire absence of mildew on the foliage of the grape, and this is entirely independent of cultural processes of manipulation or training, or of the quality of the soil in which they are planted, although the latter may sometimes exert an auxiliary influence.

In illustration of the conditions which constitute a good grape climate mention may be made of the high lands bordering Keuka Lake, in Steuben County, New York. These steep hillsides are covered with vineyards which extend for several hundred feet above the level of the lake; the soil is shaly, and in many places the surface is very thickly covered with loose stones. On these hillsides mildew is comparatively unknown, the Catawba, Iona, Delaware, and indeed all varieties of native grapes, except those which require a longer season than the climate affords, mature to a degree of perfection which they

fail to attain in more southern but less favorably situated localities. The influence of the lake is also well illustrated in the freedom from mildew on the vines which are planted quite close to the water. Higher up the valley beyond the lake, while the vines are equally as healthy on the hills there as they are on those in the near neighborhood of the lake, the plants suffer from mildew on the lower grounds, showing that the radiation of heat from the water during night has the effect of preventing dews even on low grounds near the lake. Here we have two factors, both of which are favorable to a healthy condition of vines, or rather they prevent mildew, which is the prime result, if not the cause of unhealthiness, so far as atmospheric influences are concerned. The first of these is owing to the elevation above the valley; during the day heat accumulates in the valley, and forms a stratum of warm air, which is lifted up as the colder air rushes down the slope after sundown, and wherever this warm air strikes the hillsides dews are not found.

The second important factor is the influence of the water in effecting a healthy condition of local climate. The ameliorating influence of an extensive body of water is well understood, and a noted illustration of its value is found on the shores and on the islands of Lake Erie, which have long been popular for the extent and excellence of the vineyards and the superior qualities of the fruit which they produce. This success is fairly attributable to the modifying effect of the body of water upon the atmosphere, which secures a comparative immunity from heavy night dews during the season when vegetation is most active. The heat which the water accumulates during summer has the further effect of warding off the frosts of autumn and early winter, thus virtually lengthening the season to an equality with the climates of latitudes several degrees southward, so that grapes which ripen perfectly in the vicinity of the lake fail to mature in localities immediately beyond its influence.

For all cultural purposes it is sufficiently accurate to assume that the hardiness of a grape simply depends upon its immunity from mildew. On the other hand, when a variety of our northern native grapes is said to be too tender for our winters, it simply means that it is so subject to mildew that the growths fail to ripen, as all of our native grapes of the Northern States, and indeed foreign grapes also will stand the winters, provided their young yearly growths become thoroughly matured; the summer climate rather than the winter cli-

mate decides the question of hardiness, so that when a seedling grape is announced as being perfectly hardy and exempt from rot in the berry, it may be true as far as hardiness is concerned, in the climate where it originated, if it happened to be a specially good climate, but it does not follow that it would be hardy in other parts of the country, as hundreds who have purchased such plants can abundantly testify.

Another form of mildew that may sometimes be seen on grape-leaves is a species of *Erysiphe*. This form appears on the upper surface of the leaves, also on the surface of the fruit, its appearance being somewhat similar to a dusting of fine flour, and may be brushed off without leaving any apparent marks of injury, but its effects are to retard growth. Young, green shoots once covered with this fungus cease to grow, and will remain green until the frosts of winter destroy them. When the fruit becomes severely attacked it cracks open, and the seeds will protrude. Green shoots will also crack if the mildew attacks them severely. Unlike the *peronospora* it abounds mostly in the early part of the growing season. Sudden changes of the weather from heat to cold will produce it, but our native grapes do not suffer materially at any time from this kind of mildew.

OLIVE OIL AND ITS ADULTERATIONS.

BY JOHN FRANKLIN HILDEBRAND, Ph.G.

The author's thesis contains the following survey of various tests recommended in connection with olive oil, without giving special experimental results. Olive oil is a nearly inodorous, pale greenish-yellow, unctuous fluid, with a purely oleaginous taste, peculiarly grateful to those who relish oil. It does not suffer active decomposition at a temperature not exceeding 600° F, and when cooled to below 32° F. it congeals into a granular solid mass. It is very slightly soluble in alcohol, but its solubility is increased by admixture with castor oil. It is soluble in 1½ parts of ether. When pure it has little tendency to become rancid. Specific gravity varies from about .914-.918 at 60° F. Olive oil, being, with the exception of almond oil, the most costly of the fixed oils of commerce, is consequently subject to adulterations. Nut, poppy, rape, lard and cotton-seed oils are common adulterants. Refined tallow-olein, is said to have been used in

the same way. The addition of another oil to olive oil renders it far less agreeable to the palate, and by increasing its tendency to become rancid makes it more likely to offend and derange the stomachs of those who consume it. When pure and fresh, olive oil is most wholesome as an article of food and as a condiment. In addition to the specific gravity the following tests will aid in determining its purity.

1. Olive oil loses its transparency and begins to solidify at 32° – 36° F., and is completely solidified when a small quantity is surrounded by ice or a freezing mixture; but when mixed with poppy oil it remains partly liquid, even when the latter forms only one-fourth of the mass. If more than one-third poppy oil is present, it does not solidify at all, unless cooled much below 32° F.

2. The elaidin test is a very useful one in the examination of olive oil. There are several methods of applying this test:

A. Mix the oil with $\frac{1}{2}$ part of its volume of a solution of 4 oz. mercury in 8 oz. 6 dr. nitric acid of the specific gravity of 1.5.

B. Make a mercurial solution by dissolving 6 parts mercury in $7\frac{1}{2}$ parts nitric acid, sp. gr. 1.35 without heat. Then add 1 part of this solution to every 48 parts of the oil, and shake it well every 30 minutes, until it begins to solidify. A temperature of 90° F. will cause the oil and coagulum to separate perfectly from each other.

3. Add to the oil in a test tube a small globule of mercury, or some copper turnings, and then pour in nitric acid. If the olive oil is pure, it becomes in 3 or 4 hours after the application of these tests, like a firm fat, without any separation of liquid oil, and after 24 hours the mass will be found so hard that some little force must be used to push a glass rod into it. The other edible oils do not behave in this way. The solidity of the mass is inversely proportionate to the quantity of drying oil present. When the sophistication is equal to $\frac{1}{8}$ of the whole a distinct layer separates. When the sample contains $\frac{1}{2}$ its volume of an inferior oil, $\frac{1}{2}$ only of the mixture becomes solid, and the other half remains liquid. When the adulterant is an animal oil, the mixture solidifies in about 5 hours.

But in this case the coagulum contains the animal oil, whilst the olive oil floats on the surface, and may be decanted off for further examination. The coagulum in this case when heated, exhales the odor of rancid fat or tallow.

Bach's method of testing olive oil with nitric acid: 5 c.c. of sample are shaken in a convenient tube with 5 c.c. of nitric acid, sp. gr.

1:30, for one minute and the resulting color observed, after one minute; after five minutes in boiling water; and the consistence noted after standing from 12 to 18 hours at about 60°F.

		COLOR.		CONSISTENCY.
Pure		1 Min.	5 Min.	
Olive	Oil	Pale Green	Orange-Yellow	Solid
Cotton Seed	"	Yel.-Brown	Reddish-Yellow	Smeary
Sesame	"	White	Brownish-Yellow	Liquid
Peanut	"	Pale Rose	" "	Solid
Rapeseed	"	" "	Orange-Yellow	Solid
Ricinus	"	" "	Golden-Yellow	Smeary

Mixtures of olive oil with small amounts of cotton-seed and sesame oil are distinguished by the entire mass, though at first *more darkly colored* and solidifying like pure olive oil, yielding after 24 to 36 hours a brown oil upon the surface of the solidified mass, whilst the lower layer shows the yellow color of the pure olive oil.

Oils which have been treated with alkalis show the same reactions as the pure oils. The melting and solidifying points of olive oil are so far from those of the other oils that adulteration with them, to the extent usually occurring in commerce, can be readily detected by noting the melting and solidifying points.

The following are simple tests for the most common adulterations:

Linseed oil.—Dip a polished copper wire into a mixture of 2 c.c. nitric acid with 5 c.c. of the oil; within half an hour the wire will have turned rose-red.

Cotton-seed oil.—A mixture of solution of sub-acetate of lead and pure olive oil remains homogenous, and the color is very little altered. The presence of even a small quantity of cotton-seed oil turns the color red.

Rape oil.—Saponify a portion of the oil with an alcoholic solution of potassa and stir diligently with a silver spoon, which will turn black. The solution of potassa must not contain sulphur.

Sesame oil.—Dissolve a piece of rock candy in 2 c.c. hydrochloric acid, sp. gr. 1.15, and shake well with 5 c.c. of the oil. The separated acid is colored red.

Antifibrin.—According to Prof. Bartholow, physiological and clinical observations demonstrate the efficacy of *antifibrin in epilepsy*, where there is a slow, feeble circulation, as seen by retinal examinations. Doses of gr. iij *ter die* will usually suffice.—*Coll. and Clin. Rec.*, July.

PRACTICAL NOTES FROM VARIOUS SOURCES.

BY THE EDITOR.

Test for watered milk.—The readiness with which diphenylamine is rendered deep blue by nitric acid and other oxidizing agents was pointed out by A. W. Hoffmann, in 1864. Since well water always contains more or less nitrates, Szilasi (*The Lancet*, June 11th,) recommends the detection of such water in milk by the following simple test: About twenty minims of solution of sulphate of diphenylamine are placed in a small porcelain vessel, and a few drops of the milk to be examined are added to it. If the milk contain even five per cent. of average well water a blue tinge will gradually distinctly appear. Sulphate of diphenylamine is very cheap, so the test may be readily tried.

Capsules of creasote and Tolu balsam have been successfully employed by Dr. Sommerbrodt (*Berl. klin. Woch.*, N. 15) in the earlier stages of phthisis. Each capsule contains 0.05 gm. ($\frac{3}{4}$ grain) of creasote and 0.02 gm. ($\frac{1}{3}$ grain) of balsam of Tolu. With due caution in the beginning of the treatment, the system becomes quickly accustomed to the medicine. Some patients have taken from 600 to 2000 of such capsules during the continuance of the treatment.

Oxalic acid has been found by Dr. F. Poulet (*Phil. Med. Times*) to be a valuable emmenagogue; it was employed as follows:

R	Acidi oxalici.....	1.0
	Aque	100.0
	Syr. cortic. aurantii am.....	30.0
M. Sig.	A teaspoonful every hour.	

Atropine santonate is recommended by Bourbelon (*Med. and Surg. Rep.*) as a staple compound, the solution of which produces no irritation when applied to the eye, whilst its power of dilating the pupil is the same as that of atropine sulphate. One drop of solution of atropine santonate containing one part in 2000 of water dilates the pupil in six minutes, and the action is maintained for a period varying from ten to twenty-four hours. Atropine santonate has not been hitherto obtained in a crystalline state. It appears in the form of a white powder which has no hygroscopic properties. It is requisite to observe that the santonate and its solutions ought to be preserved in flasks of yellow glass, in order to avoid the action of light and the formation of photosantonie acid. If the solution is made with cam-

phor water it causes slight smarting when first introduced into the eye. This, however, soon passes off, and has not been attended, in any case hitherto observed, with troublesome consequences.

Dusting powder of salol has been used by Dr. Georgi (*Berl. klin. Woch.*, 1887, No. 9) in facial erysipelas. The powder consists of equal parts of salol and talc. It was also found useful for removing the bad odor in ozæna, the insufflation being repeated every two hours.

Mouth-wash and gargle of salol.—Dr. Seifert (*Centralb. f. klin. Med.*, April 2, 1887,) recommends a solution of six parts of salol in one hundred parts of alcohol; a spoonful of this liquid mixed with a glass of warm water is used as a mouth-wash or gargle in stomatitis and other affections.

Calming collodion, suitable for neuralgia or for tender abraded surfaces, is recommended by A. S. Gubb (*Lond. Med. Rec.*) to be prepared from powdered mastic three parts, powdered narcotine one part, balsam of Peru one part, and chloroform six parts. (See also antiseptic collodion, p. 294.)

Antarthritic collodion, said to be very useful in gout, is made by Monin (*L'Union méd.*) from flexible collodion and ether, of each 15 parts, salicylic acid four parts, and morphine hydrochlorate one part. It should be applied to the toe every hour; the pain will soon cease and the swelling subside.

Hair tonic.—Dr. Foley, in discussing the tonic treatment of the hair (*N. Y. Med. Jour.*), states that the end we seek in building up a scanty hair crop is a proper amount of blood supply, through friction and hair tonics. The appended is an excellent hair tonic:

R. Acid. carbolic.....	3 ss
Tinct. nucis vom.....	3 ij
Tinct. cinchonæ rubræ.....	3 j
Tinct. cantharidis.....	3 ss
Aq. Coloniensis	
Ol. cocois,	āā q. s ad 3 iv. M.

Apply once or twice a day to the scalp by means of a soft sponge. This will prevent the hair from falling out, if it does not produce a luxuriant crop.

Effect of creasote on the hair.—Dr. C. J. Kelly reports (*Prov. Med. Jour.*, May 2) the case of a man who by mistake had used creasote in the place of hair oil; on the following morning the color of the hair was observed to have commenced to change, and in a few days it was quite gray.

Inhalations of carbolic acid have been found serviceable in whooping-cough by Dr. R. Pick, Dr. W. Jakobski, and others. The latter (*Brit. Med. Jour.*, April 30) devised an instrument like a toy, consisting of a pasteboard tube ornamented and provided with a handle. Within the tube are two thread nets and between them a layer of cotton wool moistened with the solution. With this Dr. Jakobski found no difficulty in getting the little patients to take the inhalation. A fifty per cent. solution of carbolic acid was used and the inhalations continued for ten minutes every two hours.

ABSTRACTS FROM THE FRENCH JOURNALS.

[Translated for the AMERICAN JOURNAL OF PHARMACY.]

PEPTONE DE SERINE.—A. Raynaud, a French pharmacist, gives this name to a peptone for hypodermic use, which he describes in the *Bull. Gén. de Thérap.*, July 30th. He says that while the the peptones in use answer for use as peptonates of mercury, iron, etc., they often give so much pain when united to other drugs that their use has to be discontinued. He proposes the following: Albumen from pure blood, 5 gm.; extractive pepsin, dialysed, 75 centigm.; distilled water, 75 gm.; hydrochloric acid, pure, 19 drops. This is digested for three days at 46° C. The liquid is then clear, and analysis shows it to contain :

Insoluble residuum.....	0.490
Syntonine.....	0.125
Dry peptone.....	3.940
Salts separated by dialysis	0.96

After purification by dialysis, concentration and evaporation by heat, on sheets of glass, this peptone appears as light-colored hygro-metric scales. Taken up by distilled water and precipitated by absolute alcohol, a very pure white powder is obtained, which would replace advantageously, the peptones of fibrin as having a composition approaching as nearly as possible to that of the blood and having the qualities needed for ready absorption.

RADIX HELLEBORI VIRIDIS has been studied by Tschistowitsch (*Nowosti Ther.*, No. 3, 1887; *Bull. Gén. de Thérap.*, July 15th, 1887), to ascertain its value in various cardiac affections during the period of non-compensation. His conclusions are as follows: In six cases the

medicament (15 drops of a solution of 1 to 100 of the aqueous extract every two hours), produced a diminution in the frequency and an augmentation of the force of the cardiac pulsations; increase in the quantity of urine eliminated, and a prompt disappearance of the symptoms of non-compensation. In two cases the amelioration was obtained by the simultaneous administration of the infusion of helleborus viridis and that of adonis vernalis, though neither of these, given separately, produced the desired effect. In three complicated cases, two with nephritis and one with pleurisy, the medication gave negative results.

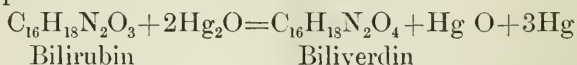
PEGANUM HARMALA, LIN. (*Nouv. Rem.*, July 8th) is described as an "African drug," although it grows as well in the sands of Spain, the Crimea and Siberia, as in Egypt. The entire plant is regarded as sudorific and emmenagogue. Dr. Pandurel, of Bombay, who prescribed it in infusion and tincture, regarded it a powerful emmenagogue, determining slight toxic effects similar to those of Cannabis indica. The dose in amenorrhœa is given at two drachms of the tincture. Egasse, who thinks the drug merits careful study, says that "the energetic action of the aqueous or alcoholic preparations is explained by the fact that the red, resinous coloring matter is a secondary product formed by the oxidization of the harmaline. For account of the important constituents see AMER. JOUR. PHAR., 1886, p. 89.

HYDRIODATE OF HYOSCINE is referred to in *Nouveaux Remèdes*, Aug. 8th, as "the best of the brain sedatives," as hydrobromate of hyoscine was found (in the same journal, Aug. 15th, 1886, AMER. JOUR. PHARM., 1886, p. 603), to be a hypnotic in mental maladies. Its information concerning the former seems to have been gained from *The Provincial Med. Jour.*, Jan., 1887. Hypodermic injections of 1 to 200 of the hydriodate of hyoscine may be given. Doses by the mouth are administered in from $\frac{1}{56}$ th to $\frac{1}{280}$ th of a grain. Chloral is stated to have the power of neutralizing the effects of hyoscine.

SOLANINE.—In a long study (*Bull. Gén. de Thérap.*, July 15th, 1887), Dr. Gaignard arrives at the following conclusions: 1. Solanine is a glucoside which does not combine with acids to form salts; under the influence of acids it decomposes into solanidine and glucose. 2. It is absolutely insoluble in water, without it be strongly acidulated, and is sparingly soluble in alcohol, ether and the oils. 3. Solanine cannot be used in hypodermic injections, the acid solutions being too caustic.

Maintained in suspension in a convenient vehicle, its own action is still more caustic. It is therefore necessary to use pills, and these should contain 10 to 20 centigrammes. The daily dose of 30 to 40 centigrammes is very well supported by patients. 4. Despite the opinion of writers who have studied this substance, we believe that it should not be classed among our best analgesics. 5. Its high price, its want of uniformity of action, and the high doses that it is necessary to prescribe do not permit us to counsel its use as an analgesic. (See also AM. JOUR. PHAR. 1887, p. 102.

INFLUENCE OF CALOMEL UPON THE DECOMPOSITION OF BILE.—Zawadsky, after a long and carefully made series of laboratory researches, cites the following conclusions: 1. Calomel has an antiseptic action upon the bile and the contents of the intestine. 2. This is explained by the transformation of the calomel in the bile and in the intestine, into Hg_2O , a transformation favored by the alkaline reaction of the contents of the intestine. 3. The characteristic color of the excrements—observed after the administration of the calomel—depends: *a*, on the one hand, upon the transformation of bilirubin (perhaps of hydro-bilirubin) into biliverdin, under the influence of Hg_2O , as per the formula:



with the liberation of metallic mercury; and *b*, on the other hand, of the presence of biliverdin (a normal constituent of bile) which was prevented from decomposition on account of the antiseptic action of the calomel and of Hg_2O . 4. The acid reaction of the medium, as also the other unfavorable conditions of the juice, explain probably, the absence of color in the excrements characteristic in some cases after taking calomel. *Laboratoire pharmacolog. du Prof. Toumass, Wratsch*, Nos. 15 and 16, 1887; *Bull Gén. de Thérap.* July 15, 1887.

Sulphurous acid in whooping cough.—A Norwegian physician named Mohl discovered after disinfecting the bedding of one of his own children who had suffered from scarlet fever, that another child who had whooping cough and who accidentally inhaled some of the fumes of the sulphur, was suddenly cured of the disease. Acting on this suggestion, he has treated other cases of pertussis by placing the patients in a room where sulphur had been burned in the usual manner in which it is employed for disinfectant purposes. He claims that after being put to bed in such a room, the patients awake the next morning cured.—*N. E. Med. Monthly.*

GLEANINGS IN MATERIA MEDICA.

BY THE EDITOR.

Ustilagine is the name of an alkaloid which Dr. C. J. Rademaker and J. L. Fischer, Ph. G., have isolated from *Ustilago maydis* (*Med. Herald*, April 1887, p. 775). The cornsmut is exhausted with dilute alcohol; after the alcohol has been spontaneously evaporated from the tincture, a little sulphuric acid is added, the mixture is dialyzed, the dialysate evaporated to dryness, the residue washed with absolute alcohol, dissolved in water, rendered alkaline by potassa in excess, agitated with ether, and the ethereal solution evaporated spontaneously. The crystalline alkaloid is white, bitter, of an alkaline reaction, and soluble in ether, alcohol and water; sulphuric acid produces a maroon color changing to green; ferric chloride colors yellow. The salts are crystallizable and soluble in water.

The other constituents found were: fixed oil, 6.5, resin, 8.0, and wax, 5.5, soluble in petroleum-benzin; trimethylamine, 1.5, sclerotic or maisenic acid, 2.0, wax, 6.25, and resin, 4.5, soluble in ether; sclerotic acid, 0.5, and resin, 3.5, soluble in alcohol; sugar, 3.75, pectin, 2.25, salts, 4.5, and extractive, 9.5, soluble in water. The authors believe trimethylamine not to be a product of decomposition of the albuminoids. Another alkaline body, but non-crystallizable, was obtained, which will be further investigated.

The acid called sclerotic acid is described as crystallizing in needles, to be soluble in water, alcohol and ether, and to yield crystallizable salts. It does not appear to be identical with Dragendorff's sclerotic acid.

Drosera Whittakeri grows plentifully on the hills near Adelaide, South Australia, and is conspicuous in the spring time by its pretty white flowers, resembling those of oxalis. From the tubers of this plant Mr. Francis extracted, by means of carbon bisulphide, a volatile red-coloring matter, which produced on silk beautiful tints with various mordants.

Prof. E. H. Rennie (*Jour. Chem. Soc.*, 1887, p. 371,) prepared the coloring matter by exhausting the crushed tubers with hot alcohol, distilling the tincture, adding water and subliming the precipitate. The sublimate, by repeated recrystallization from alcohol or acetic acid, was separated into brilliant red plates, $C_{11}H_8O_5$, and into more freely soluble orange-colored needles, $C_{11}H_8O_4$, both being, in all probability, derivatives of methylnaphthaquinone.

Heritiera littoralis, Aiton, nat. ord. Sterculiaceæ, is a tree growing in Eastern Africa, India, the Philippines and Australia. All parts of it are astringent, and the red brown seeds have also a bitter taste. Heckel and Schlagdenhauffen (*Nouv. Rem.*, 1887, p. 123,) have observed these seeds as an adulteration of kola nuts. They are readily distinguished from the latter by their nearly orbicular and flattened shape, with a diameter of about 4 cm. and a thickness of 10 to 12 mm., and by one of the fleshy-white cotyledons being only of about half the size of the other. The starch grains are polygonal, and only one-half the size of those of the kola nut. These *false kola nuts* do not yield any caffeine; they contain fixed oil, 4.4 per cent.; tannin and coloring matters, 5 per cent.; sugar, 5.7 per cent.; cellulose and starch, 56 per cent.; lignin, 12.4 per cent.; albuminoids, 13.5 per cent., and salts, about 3 per cent.

Cali nuts are described by E. Merck (*Chem. Centrabl.*, 1887, p. 343). They come from the west coast of Africa, are the seeds of a papilionaceous plant, and have a more circular shape than Calabar beans, but otherwise agree with the latter in all essential external characters. These cali nuts contain an alkaloid which closely resembles physostigmine in chemical properties and physiological action.

Acacia delibrata, A. Cunn.—Dr. T. L. Bancroft observed (*Australian Jour. Phar.*, March, 1887, p. 103) that the pod has not an astringent, but a disagreeable acrid taste. The acrid principle when isolated, was dirty-white, not crystalline, had a faint odor and an extremely nasty taste, and was soluble in water and alcohol, the aqueous solution frothing on agitation; it is a glucoside and by its chemical and physiological behavior related to, or identical with, saponin.

The ash of *ipecacuanha root* was found by H. E. Munns, (*Phar. Jour. Trans.*, April 30, 1887, p. 898) to amount to 3.22 per cent., and to have the following composition: Silica 31.98, iron and alumina, 3.53, Ca O 15.98, Mg O 4.57, P₂ O₅ 6.19, alkalies 13.80, SO₃ 4.84, Cl 1.56, CO₂ 15.25, undetermined and trace of manganese 2.30.

Roasted coffee.—Paul and Cownley have continued their experiments on coffee, (see February number, p. 94) and ascertained that there is no appreciable loss of caffeine by volatilization in the roasting operation when it is carefully carried out. The loss of weight in roasting is from 13.7 to 16 per cent., and the product consists mainly of water with a minute quantity of volatile acid, probably acetic, and

a little empyreumatic oil. In roasting coffee on a large scale, a portion of the water is at first condensed upon the cooler portion of the charge, where it dissolves some caffeine; this solution is absorbed by the thin membrane, and the latter, as the roasting progresses, is detached and carried off into the flue; this appears to be the source of caffeine in the "flights." Properly roasted coffee contains 1.3 per cent. of caffeine, but in an over-roasted coffee, which had lost 31.7 per cent., only 1.25 caffeine was found, while by calculation it should have contained 1.61 per cent.

Infusion of coffee, prepared by percolation from $\frac{1}{2}$ oz. of coffee with sufficient boiling water to yield 3 fluid-ounces, was found to contain 45 grains of extractive, including 2.36 grains of caffeine, about 12 per cent. of the latter remaining in the grounds (from which it may be exhausted by more water). A cup of coffee made in the way indicated may be expected to have a marked effect as a stimulant.—*Phar. Jour. and Trans.*, April 9, 1887, p. 821.

Nettle poison.—Some time ago Dr. G. Haberlandt, in a paper read before the Academy of Sciences, at Vienna, opposed the generally accepted view of the presence of formic acid in the stinging hairs of *Urtica dioica* Lin., and *U. urens*, Lin., showing that formic acid had no such virulent properties in the minute quantities in which it could be present in the nettle hairs; he considered it probable that the poison was a non-volatile albuminoid compound, perhaps an unformed ferment.

David Hooper, however, shows (*Phar. Jour. and Trans.*, April 9, 1887, p. 822) that the Nilgiri nettle (*Girardinia palmata*, Weddl., contains in its hairs a volatile acid, reducing permanganate and salts of silver and mercury, and forming a lead salt soluble in water, but insoluble in alcohol; this behavior points to formic acid. The solid contents, obtained on evaporation, consisted apparently of albuminous matter with a trace of ash.

Euphorbium consists, according to G. Henke, (*Archiv d. Phar.*, 1886, p. 729-759,) of 34.6 euphorbone, 26.95 resin soluble in ether, 14.25 resin insoluble in ether, 1.1 caoutchene, 1.5 malic acid, 20.40 gum and salts, of which two-fifths are precipitated by alcohol, and 1.2 other substances soluble in ammonia. *Euphorbone* is extracted by petroleum benzin (boiling point $65^{\circ}\text{C.} = 149^{\circ}\text{F.}$), and is best purified by dissolving in ether, adding alcohol until a permanent turbid-

dity appears, allowing the yellow resin to subside, evaporating the clear liquid and crystallizing from benzin. It forms glossy white needles, is tasteless, melts between 67° and $68^{\circ}\text{C}.$, is dextrorotatory and has the composition $\text{C}_{20}\text{H}_{36}\text{O}$. It has a neutral reaction, is freely soluble in benzin, benzol, chloroform, acetone, ether and strong alcohol, is almost insoluble in hot water, and is not affected by diluted acids and by alkalies.

Aristolochia cymbifera, Martius.—The root of this plant has again appeared in the European drug market, and consists of pieces about 10 cm. (4 inches) long, gray-brown, longitudinally wrinkled, the thickest roots being split; the transverse section shows a rather thick bark, and a ligneous cylinder, which is distinctly radiating, and contains wide dotted ducts and wood-fibres; the bark and medullary rays contain much starch, and in numerous but slightly enlarged cells, a mixture of yellow resin and volatile oil.—*Chemiker Ztg.*, 1887, p. 379.

The root is known in Brazil as *milhomem*, also as *jarra* and *jar-rinha*, and has a camphoraceous odor, resembling that of serpentaria, and a bitter and pungent taste. The roots of a number of other species of *Aristolochia* have similar properties and are also used under the same names as the preceding, the medical properties being analogous to those of serpentaria. The drug has been repeatedly used in Europe during the last century and more recently, but does not appear to be superior to other well known remedies.

Cryptocarya australis, Bentham; nat. ord. Lauraceæ.—In a paper read before the Royal Society of Queensland, Dr. T. L. Bancroft states (*Austral. Jour. Phar.*, March 1887, p. 103) that the bark is persistently bitter and has a toxic action, due to the presence of an alkaloid crystallizing in stellately arranged needles. When given to warm blooded animals respiratory difficulty is produced, ending in asphyxial convulsions and death. It has also a poisonous action on reptilia.

Daphnandra repandula is a new species found by Dr. Bancroft near the Johnstone river. All parts of this species have a peculiar transient bitter taste; the inner surface of the fresh bark is white, but becomes metallic black on exposure to the air, and again loses this color on drying. The aqueous extract is very poisonous, 10 grains being a fatal dose for warm-blooded animals, and is very rich in alkaloids, all of which, Dr. Bancroft states, are colorless and crystalline. The ac-

tive alkaloid is soluble in water and to some extent is antagonistic to strychnine. *Daphnandra* retards the development of bacteria, deodorizes putrid meat, checks the growth of the yeast plant, and kills some water plants.

Daphnandra micrantha, *Bentham*, has similar properties; it is a shrub growing in the neighborhood of Brisbane.

Curacao aloes.—Prof. W. Stæder has examined the aloin prepared from this variety by Tilden's process (*Nieuw Tijdsch. Phar. Med.*, p. 98; *Phar. Jour. Trans.*, April 2, 1887). The yield was 5.5 per cent. It is odorless, bitter, melts giving off the odor of caramel, is almost insoluble in chloroform and ether, moderately soluble in water and very soluble in spirit. The yellow, aqueous solution reduces Fehling's solution, is rendered darker and red by ammonia, and, on being heated, becomes red, beginning with the upper layer. Sulphuric and nitric acids color it a pure red, but on stirring, the mixture becomes yellow. If then the vapor of fuming nitric acid be passed over it, a grayish-blue color is produced, which quickly disappears. Bromobromide of potassium gives an abundant precipitate, but tannin gives no precipitate. Thus Curacao aloin resembles nataloin in the effect produced by fuming nitric acid, and is like barbaloin and socaloin in the formation of a bromo-derivative, but differs from barbaloin in not giving a precipitate with tannin.

MEXICAN LIGN ALOES.

By E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

Although the essential oil bearing the above name has been a commercial article for many years, and was noticed in the columns of this journal by Mr. J. Collins as long ago as 1869, yet nothing definite has been ascertained concerning its botanical source until quite lately. Three years ago a description of the tree yielding the oil was published by M. Poisson in the *Bull. de l'Assoc. Franc. pour l'Avancement des Sciences*, xiii., p. 305, pl. x. (Blois, 1884), but in consequence of the difficulty of access to this publication it has been overlooked even by the authors of the '*Biologia Centrali-Americana*,' and it was only during a recent visit of Professor Baillon to the Museum of the Pharmaceutical Society that my attention was called by him to the article

in question. It seems desirable, therefore, to place on record in this Journal an abstract of that paper.

M. Poisson was led to inquire into the botanical source of the product through seeing specimens of the wood and oil at the Paris Exhibition of 1878, where these products were exhibited by Messrs. Ollivier and Rousseau, of Paris. These gentlemen obtained specimens of the leaves, flowers and fruit from their correspondent in Mexico, M. Delpech, in whose honor the tree has been named by M. Poisson. The description he gives of the tree is as follows:—

“*Bursera Delpechiana*.—Foliis apice ramulorum congestis, tenuibus novellis utrinque, imprimis subtus, costis et nervis tenuiter pilosis, 3 jugis; foliolis ellipticis, utrinque acutis, crenato-serratis; interstitiis inter juga anguste alatis; paniculis folia æquantibus breviter pilosis, compositis, laxifloris, bracteolis angustissime linearibus, pedicellis tenuissimis, calycis lobis brevibus deltoideis atque petalis oblongis 5 poll. longioribus, sparse et longe pilosis, staminibus quam petala paullo brevioribus, filamentis quam antheræ oblongo-ovatæ 4 poll. longioribus; drupis ovoideis glabris.”

“Folia 5-6 cent. longa, interstitiis interjugalibus 7-8 mill. longis, 1-1½ mill. latis; foliola 1½-2 cent. longa, 8-10 mill. lata, nervis lateralibus 1½-2 mill. distantibus. Paniculæ (e cymis compositæ) axillares numerosæ 5-7 cent. longæ, ramulis secundariis 1½-2 cent. longis, pedicellis 3-4 mill. æquantibus, bracteolis tenuissimis 2-4 mill. longis. Calycis lobi vix 1 mill. longi. Petala (æstivatione valvata) 4 mill. longa, 1 mill. lata. Stamina filamenta 3 m. longa, antheræ vix 1 mill. æquantes. Drupæ fere 1 cent. longæ. Mexico circa urb. dict. Cuantla Morelos.”

The species is characterized by the excessive brevity of the calyx, of which the lobes are not well marked. It belongs to the set of species peculiar to Mexico, including *B. Aloexylon*, Engl., and *B. penicillata*, Engl. The tree is of medium height. According to M. Delpech, the wood in a fresh and healthy state is almost devoid of odor, and it is only where a branch has been broken off or insects have pierced the wood that the oil becomes developed.¹ He states that old trunks may afford as much as 10 to 12 per cent. of oil. This difference in the wood is not recognized by the native Indians who collect it, and consequently the tree is felled in a reckless manner, so

¹ The section of wood in the Museum of the Society is about 6 inches in diameter, but shows no sign of insect-boring.

that it has almost disappeared from Cuantla Morelos, where it formerly abounded. The pure oil is obtained by M. Delpech by distillation by steam heat, and costs 20 to 25 francs per kilogram; an inferior oil prepared by the natives is sold for a lower price.

The structure of the wood presents the following characters. The fibres are of medium length with the walls only slightly thickened; each is divided transversely by numerous thin walls constituting a kind of ligneous parenchyma, of which the whole wood is formed. On transverse section the fibres are seen to be all of equal thickness, so that it is not easy to distinguish the zones of growth of the wood.

The vessels are of large size, with numerous transverse trabeculae, which on longitudinal section are seen to give a moniliform appearance to the vessels; they are dotted all over, the dots being surrounded with areolae.

The medullary rays are thin, and have two to four courses of cells in thickness. It is chiefly in the fibres and medullary rays that the nearly solid odorous substance occurs. It is of a yellowish resinoid aspect under the microscope, and fills them either wholly or partially. All the fibres, however, do not contain it, and it is most abundant where the wood is streaked with dark veins. This matter is soluble in alcohol, so that the wood treated with spirit becomes transparent under the microscope. In the green and healthy state the wood presents the same appearance, without any trace of oil, although at the same time the oil may be perceived in the fruits and bark by rubbing them. In M. Léon Marchaud's memoir on the "*Organization of the Burseraceæ*," a somewhat similar occurrence is mentioned. The resinous and perfumed matter of *Balsamodendron Myrrha*, *B. africanum* and *Protium obtusifolium* is localized in the pith of the young branches to some degree, but is abundant in the bark and pericarp of the fruits of these plants.

The oil of lign aloes has been examined by Messrs. Verneuil and Poisson. Their experiments show that the wood cut into shavings readily yields the oil by distillation with steam, 7 to 9 per cent. being thus obtained, and the wood when dry is then found to be free from odor.

When the oil is dried over chloride of calcium, it distils over almost entirely between 189° and 192°, a small quantity of a resinous body of a much less volatile character remaining in the still. It is an oxygenated body having the formula $2(C_{10}H_8) 5 H_2O$, this for-

mula answering to that of a hydrate of terebenthene or of an insomer. The oil slowly absorbs oxygen and becomes resinified. It does not combine with bisulphite of sodium. The red-brown coloration which it takes under concentrated sulphuric acid is analogous to that which turpentine produces with the same acid. The odor of the oil is likened by M. Poisson to a mixture of lemon and jasmin. The specimens that I have seen have more resemblance to bergamot in odor.

It is difficult to say whether other species of *Bursera* yield this oil or no. M. Poisson suggests that it is probably obtained also from *Bursera Aloexylon*, Engl. (*Elaphrium Aloexylon*, Schiede).

The new Mexican Pharmacopœia (1884), p. 75, also gives *Amyris linaloe*, La Llave, which is a synonym of *Bursera Aloexylon*, Engl., as the source of the oil.

Schlechtendal, however, in 'Linnæa' (1843), xviii., p. 303, remarks that this species has a fennel-like odor. A specimen in the Kew Herbarium, presented by Mr. Piesse as the Lignaloe plant, is labelled "*Elaphrium graveolens*, K.," from the West coast of N. Mexico. This identification is, however, according to Professor Oliver, somewhat uncertain. Several other species of *Bursera* grow in the same district, as *B. Delpechiana*, including *B. bicolor*, Engl., *B. Schiedeana*, Engl., and *B. jorullensis*, Engl., but nothing appears to be known about the oil of these trees. Schlechtendal mentions, *l. c.*, that *Elaphrium glabrifolium* (= *Bursera penicillata*, Engl.) has a strong aromatic odor, and that *Amyris ventricosa* (= *Bursera fagaroides*, Engl. var.) has an odor of caraways. The Mexican species of the genus appear to be very numerous, and require further examination as to their economic products. It is, however, satisfactory to be able to refer Mexican oil of lign aloes with certainty to one species, for there can be no doubt that *B. Delpechiana* is one of the principal sources of it.—*Phar. Jour. and Trans.*, Aug. 13, 1887, p. 132.

"Delirium after salicylate of sodium."—Schiffers *Progrès Méd.* records a case in which an enema containing 75 grains of salicylate of sodium was administered to a girl of seven, suffering from mitral insufficiency. Delirium supervened, with hallucinations of vision. Speech was slow and difficult, answers to questions being indistinct and confused. There were no motor disturbances. The symptoms disappeared without treatment in one day.—*Med. Chronicle*.

NOTE ON THE SEPARATION OF HYGRINE FROM COCAINE.

BY WM. C. HOWARD, PH.D.

The question whether amorphous cocaine and hygrine are identical, the great difficulty attending the separation of cocaine from the basic mass, and also Dr. Stockman's paper on "Amorphous Cocaine" (*Pharm. Jour.*, April 23, 1887) led me to doubt the existence of an amorphous cocaine.

The plan of separating the basic principles by means of their platinum salts I have before found useful in dealing with alkaloids, and so tried it on the solution of cocaine in hygrine. The liquor containing the cocaine, hygrine, etc., was neutralized with hydrochloric acid; the amount of heat given off proved that strong alkaloids were present. It was then fully precipitated with platinum chloride, allowed to stand for a night, and filtered off. The mixed salt was amorphous or semi-crystalline, and rather light in color. This was then washed with a large quantity of water at about 80° C.; a higher temperature was tried, but the salt caked.

The soluble salt decomposed with sulphuretted hydrogen; shaken into ether and the ether evaporated off gave a base that, when cold, crystallized. This base was then dissolved in acid, and shaken into light petroleum ether, and the ether evaporated off. The base crystallized at once. The platinum salt of this proved to be a light-colored, bulky, semi-crystalline precipitate; it was dried, washed with carbon bisulphide to remove sulphur, and finally dried over sulphuric acid and analyzed:

I. 0.1878 gram gave 0.0358 gram platinum.		
II. 0.2362 gram gave 0.0455 gram platinum.		
Reckoned for.	Found.	
$(C_{17}H_{21}NO_4HCl)_2PtCl_4$.	I.	II.
Pt. 19.38 per cent.	Pt. 19.06 per cent.	19.26 per cent.

The base giving the soluble platinum salt then was cocaine, and the strong anæsthetic effect confirmed the analysis.

The insoluble platinum salt was then decomposed with sulphuretted hydrogen, shaken into ether, and the ether evaporated off, leaving the base as a fluid in which, though on standing it thickened considerably, no crystals appeared in a week or more. According to Lossen (*Annal. der Pharm.*, exxi., 374) hydrochlorate of hygrine crystallizes freely. The base smells of trimethylamine, has no bitter taste, and

gives a platinum salt which is decomposed by heating the liquid. The base I obtained gives no crystallizable hydrochlorate. The smell does not remind one of trimethylamine. It has an intensely bitter taste, and the platinum salt stands hot water well. It seems, therefore, probable that either Lossen's base was impure, or that mine is a different base altogether. He unfortunately also gives no analysis.

The platinum salt, which is darker in color, and much less bulky than the soluble salt, differs in composition, as shown by the following analysis :—

I. 0.1488 gram gave 0.0275 gram platinum.	
II. 0.1894 gram gave 0.0353 gram platinum.	
I.	II.
Pt. 18.48 per cent	18.6 per cent.

The base was, as above mentioned, extremely bitter, and is probably a body containing three atoms of carbon more than cocaine; it produces no numbing effect on the tongue.

Amorphous cocaine has, therefore, as far as I can judge, no existence, but is a solution of cocaine in the base above described. I hope to continue my research on this alkaloid if I can obtain enough material, as it is only contained or formed in small quantities.—*Phar. Jour. and Trans.*, July 23, 1887, p. 71.

THE ALKALOIDS OF COCA LEAVES.¹

BY O. HESSE.

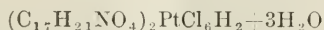
According to the observations I have made in reference to this subject, I have not become acquainted with anything to support the opinion put forward by Stockman, that amorphous cocaine is a solution of true cocaine in hygrine, although the amorphous base may contain some hygrine as the result of decomposition of some one or other coca base, and though hygrine may be separated from it by continued distillation with water, owing to its gradual formation, until the whole of the amorphous base is decomposed. Since the dilute solution of hygrine in hydrochloric acid has a strong blue fluorescence, this character furnishes a means of ascertaining whether or not hygrine is present in coca leaves. For this purpose it is only requisite to moisten the finely-divided leaves with ammonia, and shake with ether,

¹ From the *Pharmaceutische Zeitung*, July 16. Reprinted from *Phar. Jour. and Trans.*, July 23, 1887.

then to extract the bases taken up by shaking the ether solution with dilute hydrochloric acid. When sound leaves are operated upon in this way the acid solution obtained presents at first no fluorescence, but after a time it gradually becomes distinctly fluorescent, showing that hygrine is a product of subsequent decomposition.

Hygrine is separated from solution in acids by ammonia or caustic soda solution as a colorless oil, with a basic reaction and a peculiar odor which crude cocaine sometimes possesses. Its solutions in dilute acids present a fine blue fluorescence. The solution in excess of hydrochloric acid gives, when mixed with chloride of lime solution and excess of ammonia, only a milky turbidity, but no coloration. A solution of the hydrochlorate also gives no color when mixed with ferric chloride; with gold chloride it gives a yellow oily precipitate, and with platinum chloride a pale yellow crystalline precipitate.

As regards the amorphous portion of the coca bases which can be easily separated from cocaine, the above-mentioned fluorescent character of hygrine admits of the presence or absence of this base being ascertained. The material I operated upon contained no hygrine, and it gave a platinum salt that yielded in two experiments 18.26 and 18.44 per cent. of platinum, the amount of water being respectively 5.00 and 5.50 per cent. These results would correspond satisfactorily with the formula



according to which the amorphous base would appear to have the same composition as cocaine. It is, however, evident that this amorphous material is not homogeneous, since I was able to separate from it by fractional precipitation a well-defined base, to which I have given the name of "cocamine," but I must add that at present I have only been able to obtain this base from a small-leaved variety of coca.

This new base has the same empirical formula as cocaine, $C_{17}H_{21}NO_4$. It dissolves readily in alcohol, ether or chloroform, and on evaporating these solutions, it remains in an amorphous condition. It dissolves with difficulty in petroleum spirit and in water. Dilute acids dissolve it readily, and ammonia produces in these solutions a voluminous flocculent white precipitate that appears crystalline under the microscope. The hydrochlorate of this base, $C_{17}H_{21}NO_4HCl$, is amorphous, has a neutral reaction, and is readily soluble in water and alcohol, but these solutions soon become acid. When dried at 120° C. the salt continues to lose weight, and eventually becomes no longer

soluble in cold water, but communicates to it an acid reaction. On the contrary the crystalline platinum salt, $(C_{17}H_{21}NO_4)_2PtCl_6H_2 + 4H_2O$, only loses its water of crystallization at that temperature.

Cocamine melts at about $80^\circ C.$, and it decomposes when heated a little above $100^\circ C.$, or when boiled with an alcoholic solution of baryta. In this latter case an acid is produced which crystallizes from ether in needles like benzoic acid, but does not appear to be identical with it, since the ammonia salt gives with lead acetate a white flocculent precipitate, and with silver nitrate a white milky turbidity which lasts in a remarkable way for several weeks before a precipitate is formed.

The basic product formed in this decomposition does not appear to be ecgonine, for though dissolving readily in water, communicating to it a basic reaction, and crystallizing on evaporation in long broad needles, I did not succeed in obtaining from this base the characteristic platinum salt of ecgonine. The salt I obtained dissolved readily in water and in hot alcohol, separating from the latter solution only in translucent globular masses.

In confining myself for the present to the communication of these data I wish to add that I purpose continuing the investigation of the subject, and especially that of hygrine and cocamine.

NOTE ON THE CHEMISTRY OF STROPHANTHIN.¹

BY T. R. FRASER, M.D., F.R.S.

Since former communications on the chemistry of *Strophanthus hispidus*, Professor Fraser has completed a systematic examination of various parts of the plant, more particularly of the seeds. Reserving a detailed description, a few of the results are now briefly stated. The active principle occurs most abundantly in the seeds. The body obtained by treating the alcoholic extract with ether, as described some years ago, possesses great pharmacological activity, and has the characteristics of a glucoside. In some subsequent experiments, however, although the same process was followed, a well-marked crystalline product was not always obtained, and it then became evident that the difference was due to some variation in the seeds operated on. It was also found that the body obtained by the process formerly described,

¹ Abstract of Note read before Royal Society of Edinburgh, July 15, 1887. Reprinted from *Phar. Jour. and Trans.*, July 23.

whether in well-defined crystals or not, was resolvable by acetate of lead into at least two bodies, one of which is an extremely active glucoside, and the other an acid for which the name *kombic acid* is suggested. It being apparent, therefore, that the strophanthin first described is not a simple substance, attempts were made to improve the process so as to separate strophanthin in its pure state. The following is the process ultimately adopted. Starting with the product obtained in the earlier process, it is dissolved in water, tannic acid is added, and the tannate digested with recently precipitated oxide of lead. Rectified and proof spirit are now used to extract, and the extract obtained is dissolved in a small quantity of rectified spirit, and the solution precipitated by ether. The precipitate is finally dissolved in weak alcohol, and through this solution carbonic anhydride is passed for several hours, by which means lead is completely got rid of. After filtration the solution is evaporated at a low temperature and dried *in vacuo* over sulphuric acid.

Strophanthin thus obtained is imperfectly crystallized, neutral in reaction, intensely bitter, freely soluble in water, less so in rectified spirit, and nearly insoluble in ether and chloroform. It burns without residue, and contains no nitrogen. The percentage composition from the average of several closely agreeing results was found to be—

$$C=55.97, H=7.75, O=36.28,$$

which agrees fairly with the formula $C_{20}H_{34}O_{10}$.

Strong sulphuric acid produces with strophanthin a bright green color, which soon becomes greenish-yellow and brown. Sulphuric acid and potassic bichromate give a blue color in addition to the coloration caused by the acid alone. Phosphomolybdic acid produces a bluish-green color, which on addition of water becomes pure blue. With a 1 per cent. solution in water, phosphomolybdic acid causes slowly a bright bluish-green color. Tannic acid produces an abundant white precipitate, soluble both in excess of the acid and of strophanthin. The solution is not changed in appearance by acetate or subacetate of lead, platinic chloride, ferric chloride or mercuric chloride. Nearly all acid reagents cause the solution to become hazy, and it is then found that the solution contains glucose. This decomposition is also produced by sulphuretted hydrogen, especially in the heat, and for this reason it is not advisable to use sulphuretted hydrogen in any process for preparing strophanthin.

Indeed, all the mineral acids, except carbonic, and many of the

organic acids, resolve strophanthin, even in the cold, into glucose and a substance which the author names strophanthidin. A very pretty crystallization of the latter may be obtained in a few hours, when strophanthin is dissolved in a 1.5 per cent. solution of sulphuric acid. When strophanthin was decomposed at the ordinary temperature by contact for four days with 1.5 per cent. sulphuric acid, there were obtained 37.5 per cent. of strophanthidin in crystals, and about 20 per cent. of glucose, but the estimation of the latter with Fehling's solution is uncertain on account of the green coloration developed in the fluid. The strophanthidin having been removed by filtration, and the almost colorless bitter and acid liquid having been boiled for four hours, it was now found that the glucose had increased to 26.64 per cent. and that about 4.3 per cent. of an amorphous substance had been formed.

This action of acids renders it apparent that an acid, and especially a mineral acid, should not be used in the preparation of strophanthin. Thus in 1877, some years after the author's first communication on the subject, Hardy and Gallois described a process in which by using, for the extraction of the seeds, rectified spirit acidified with hydrochloric acid, they obtained a crystalline product which they believed to be strophanthin. There can be little doubt, however, that their product was strophanthidin, not only because the process employed would decompose the strophanthin into strophanthidin and glucose, but also because their crystallized product was found not to yield glucose when heated with dilute sulphuric acid. Hence they conclude that strophanthin is not a glucoside.¹ The glucosidal character of strophanthin has now been amply demonstrated from many experiments made by Professor Fraser, and by subsequent observers, especially by A. W. Gerrard.² The glucose was not only determined by Fehling's solution but also by fermentation with yeast.

Cocaine in croup.—Labric praises cocaine as the best remedy for croup. He applies a brush dipped in a five per cent. solution of cocaine to the throat for several seconds; a few drops are allowed to go down into the larynx. The operation is repeated two or three times a day, and nothing but a little black coffee is administered to the patient.—*N. E. Med. Monthly*.

¹ *Jour. de Pharm.*, xxv., 177.

² *Pharm. Jour.*, May 14, 1887. *AMER. JOUR. PHAR.*, August, p. 426.

THE CHEMISTRY OF "CACUR."

BY G. ARMSTRONG ATKINSON, M. D.,

Assistant to the Professor of Materia Medica, University of Edinburgh.

(From the Pharmacological Laboratory of the University).

In the *Edinburgh Medical Journal* for July, 1886,¹ I published a note on the action of cacur, cacuo or small bitter apple, cacur being the Kaffir name for the fruit of the *Cucumis myriocarpus* (Cucurbitaceæ). In this paper it was shown that the fruit in small doses is purgative, in larger emetic, and if sufficient of the drug be retained after vomiting has occurred purgation also ensues. The action is somewhat like that of colocynth as far as its purgative qualities go, but it differs in that it more readily induces vomiting. The supply of the drug at the time these experiments were carried out was too small to permit of any chemical examination. Through the kindness of Mr. J. A. B. Bayley, a further supply of the fruit was forwarded me some months ago, and as from experiments with other parts of the plant I had satisfied myself that the fruit alone was active, it only was examined in detail. The fruit is a pepo, the pepoes are caducous, subglobose, and vary in size from small to very large gooseberries, which they resemble in form. When unripe they are green, when mature yellow, and are beset somewhat sparingly with short soft prickles. The South African natives use them principally as an emetic, generally in their green or yellowish-green state. The fruit does not spontaneously expel its contents. Each pepo weighs from 50 to 100, or even 130 grains, the average weight being from 70 to 80 grains. The placentæ are parietal, and bear numerous ovoid, flattened, ex-albuminous, almost white seeds, the testæ of which have a faint bitterness, apparently absorbed from the surrounding pulp. The seeds constitute about 14 or 15 per cent. by weight of the fresh fruit. The pulp is very watery and has a faint cucumber-like odor, and a very bitter taste. The rind is soft and thin, and can only be peeled off with considerable difficulty; its inner layers have the same odor and bitter taste which characterizes the pulp. The pulp and rind when dried lose weight very markedly; 1000 grains of rind and pulp from which the seeds had been removed when dried so as to be powdered, weighed only 53 grains. In drying it is necessary to use a low heat or the active principle will be decomposed. The usual purgative dose em-

¹ See AMER. JOUR. PHAR., Dec., 1886, p. 614.

ployed is one pepo, which when dried and the seeds removed would weigh about three or four grains; two pepoes are employed when emesis is desired. In either case the Kaffirs heat the fruit before using it, probably to render the pulp more watery, as they squirt the contents of the pepoes into their mouths and swallow the expelled material. A considerable quantity of colloid material is in the pulp, and doubtless assists the action of the drug by retarding absorption of the active principle, for this when isolated, as described below, acted less constantly than the fresh pulp. No tannic acid is found in the fruit, but a considerable quantity of chlorophyll is present. The active principle, as mentioned above, is injured by a high temperature, as by that of boiling water; this, together with the fact that few reagents precipitate it, render its isolation somewhat difficult by any of the ordinary processes, which were all tried with varying and inconstant results. The method which gave a satisfactory yield, quantitatively and qualitatively, was very simple. The seeds were removed from the pepoes, which were cut up as finely as possible and then dried at a low temperature in an air-bath. The product was powdered and exhausted with rectified spirit. The spirituous solution was evaporated almost to dryness, as small an amount of heat as possible being employed, and the residue dissolved in a little water to which freshly precipitated oxide of lead was added to decolorize the solution. This required about twenty-four hours with frequent agitation. The mixture was then filtered, and the almost colorless filtrate exhausted with ether without further evaporation. The ether extracted the active principle, and when decanted was quite colorless, but possessed a very bitter taste. After slow evaporation of the ether a very pale yellow body was left, which became resinoid in appearance and brittle, being easily reduced to a pale yellow powder, intensely bitter, and producing the pharmacological actions of the fruit, but not, as previously stated, being so constant in action. The yield was very small; it was quite amorphous, no method of treatment yielding any trace of crystallization. The body so extracted dissolves readily in water; it is soluble in alcohol of all strengths, but less readily in very strong than in weaker alcohol. In ether it dissolves, but not very readily, although sufficiently to allow extraction by its means. In chloroform it is only slightly soluble, and less so in petroleum spirit. When heated on the platinum foil it burns readily with little charring, and leaves no residue. Strong sulphuric acid dis-

solves it with the production of a brownish-red color, and Fröhde's reagent produces the same color reaction. Nitric, hydrochloric and acetic acids give no distinct color reactions. The watery solution is neutral to litmus paper. Tannic acid produces a bulky yellow precipitate soluble in excess of the reagent. Phosphomolybdic acid, solution of iodine in iodide of potassium, platinic chloride, iodide of bismuth and potassium, iodide of potassium and mercury, pierie acid, acetate and basic acetate of lead, ferric chloride, nitrate of silver and mercuric chloride are without visible effect. Solutions of alkalies turned the practically colorless watery solution yellow, and the bitterness entirely disappears; if digested some time with dilute acids a similar coloration and loss of bitterness occurs, and a similar result is obtained on merely boiling for some little time. In all cases a yellowish flocculent precipitate separates out which is tasteless, and apparently without action. The watery solution reduces Fehling's solution, but does not ferment with yeast, nor does any of the solutions which result from treatment of the watery solution with an alkali, with an acid, or with heat alone. No other active body was detected in the fruit. The active substance is thus seen to be apparently a neutral principle, which is not a glucoside, and in accordance with the usual nomenclature might be termed "myriocarpin."—*Phar. Jour. and Trans.*, July 2, 1887, p. 1.

USEFUL PREPARATIONS OF IODOL.

Dr. Wolfenden, of London, mentions in the *Practitioner* for May, 1887, the following as preparations which he has found useful:

1. *Powder of iodol*.—The pure powder may be used. There is no need to mix it with starch or sugar, etc., since, being fine, it is readily dusted over a raw surface, or insufflated into the throat. Possessing no toxic power, it is of more importance to cover the diseased surface than to measure the dose. For all laryngeal, pharyngeal, and most nasal and oral conditions this is, perhaps, the most generally useful application.

2. *A solution in alcohol and glycerin*.—This was Mazzoni's original application: iodol, one part; alcohol, sixteen parts; glycerin, thirty-four parts. This forms a good application by means of the brush, or may be used as a very coarse spray.

3. *Iodol, 1 drachm; ether, 1 ounce*.—This forms a clear brown

solution, useful for application either by the spray or brush. The ether quickly evaporating leaves the powder *in situ*. It is useful for naso-pharyngeal atrophic conditions.

4. *Iodol*, 1 drachm; *glycerin*, 1 drachm; *vaseline*, 7 drachms.—This is a modification of one of Rumbold's sprays. It is a very soothing application for pharyngeal conditions. It requires to be warmed before using.

5. *Iodol pastilles*.—*Iodol*, 1 grain; *glycerin*, 1 minim; *glycogelatin*, 18 grains. These are very useful for chronic pharyngeal conditions, and are much preferable to iodoform pastilles.

6. *Iodol bougies*, containing $\frac{1}{2}$ a grain iodol in each. These are made for use in diseased nasal conditions.

7. *Iodol wool*, 10 per cent., for tampons, etc.

8. *Iodol gauze* for dressings.—*Medical News*, July 16.

BLUE IODIDE OF STARCH.¹

By F. MYLIUS.

The analogy between iodide of starch and iodochoic acid, is shown by the following facts: (1) Iodine solutions which color starch contain either hydriodic acid or one of its salts; (2) the presence of substances, such as chlorine, which decompose hydriodic acid, prevents the formation of iodide of starch; (3) silver solutions decolorize solution of iodide of starch—the color is restored by adding potassium or hydrogen iodide; (4) an aqueous solution of iodine cannot color starch blue; the blue color appears at once when a trace of hydriodic acid or potassium iodide is added.

When starch is added to a solution of iodine and hydriodic acid containing sulphuric acid, iodide of starch separates: the amount of iodine and hydriodic acid which has been absorbed by the starch can be readily determined by titration. The results of several experiments show that the proportion of iodine absorbed to that of the hydriodic acid is 4: 1, and it is probable that the resulting compound has the formula $(C_{24}H_{40}O_{20}I)_4, HI$. From this, the author concludes that the formula of starch is $C_{24}H_{40}O_{20}$, which is that ascribed to it by Pfeiffer and Tollens (1882).

Iodide of starch dried in a vacuum appears to be anhydrous. The

¹*Ber.*, xx., 688-695; reprinted from *Jour. Chem. Soc.*, June, p. 568.

barium compound was analyzed, and has probably the composition expressed by the formula $(C_{24}H_{40}O_5I)_8, BaI_2$. The *potassium* and *sodium compounds* are soluble, the *barium* and *zinc compounds* are insoluble.

ON A NEW TYPE OF BLUE IODINE COMPOUNDS.¹

By F. MYLIUS.

Iodocholic acid, $(C_{20}H_{40}O_5I)_4, KI + xH_2O$, is obtained by adding a concentrated aqueous solution of 1 gm. of potassium iodide to a solution of 2 gm. of cholic acid and 0.8 gm. of iodide in 40 c.c. of alcohol. The mixture is gradually diluted with water until the blue substance separates. This is then collected and washed with water. It forms a matted mass of bronze-like lustre. When suspended in water (500 c.c.), an indigo-blue liquid is produced. When the latter is heated, it becomes yellow and cholic acid separates; when a few drops of the blue liquid are poured into water, the blue color disappears in a few moments, and the solution is found to contain free iodine. The substance is therefore decomposed by excessive dilution. Sulphurous acid decolorizes the liquid with separation of cholic acid. The solution is also decolorized by adding a few drops of soda solution, with formation of sodium cholate, iodide, and iodate; on adding hydrochloric acid, the blue compound is re-formed. When iodocholic acid is dried in a vacuum, a dark, lustrous, crystalline powder is obtained which dissolves in ether containing alcohol, yielding a yellow solution; this, when evaporated, leaves a yellow, amorphous substance which is anhydrous iodocholic acid. The latter becomes blue in presence of water.

The *compound* $(C_{24}H_{40}O_5I)_4, HI$ is prepared by adding a small quantity of hydriodic acid to the brown solution of cholic acid and iodine. The liquid at once becomes blue. The compound is isolated in a manner similar to the potassium compound which it completely resembles. The *barium compound*, $(C_{24}H_{40}O_5I)_8BaI_2$, and the zinc, cadmium, and ammonium compounds are obtained by using corresponding iodides in the place as potassium or hydrogen iodides.

Salol in Sciatica.—Dr. v. Aschenbach, of Corfu, reports in the *Fortschritt der Med.* that suffering from sciatica, for which all known remedies had been tried in vain, he, in the evening, took a dose of half a gram of salol, and at night one gram, after which he fell asleep and remained perfectly free from his pains.—*Am. Pract. and News.*

¹ *Ber.*, xx., 683-688; reprinted from *Jour. Chem. Soc.*, June, p. 606.

ON THE ESTIMATION OF GLYCERIN IN FATS.¹

BY OTTO HEHNER.

In the publication of the principle upon which the method to be described in the following paper is based, I have quite recently been forestalled by L. Legler (*Analyst*, January 1887), and I, therefore, cannot lay any claim to originality. But as I operate in a manner quite different from that adopted by Legler—his process being only applicable to somewhat concentrated glycerin liquor, whilst I am enabled to determine the glycerin in even the most dilute solutions—I venture to lay a description of it, and of results obtained, before the members of the Society. A portion of my investigation is, furthermore, of general importance, and concerns all methods of glycerin estimation, since it treats of the question of the volatility of glycerin with aqueous vapor.

Glycerin decomposes, on treatment with bichromate of potassium and sulphuric acid, into carbonic acid and water. Legler weighs the carbonic acid, or rather the loss of carbonic acid, in an ordinary carbonic acid apparatus. Messrs. Cross and Bevan (*Chemical News*, Vol. 56, p. 2), measure the volume of the gas evolved.

It is evident that both these modifications require limited bulks of fluid, and, therefore, exclude the estimation of glycerin in very dilute solutions, such as are obtained in the analysis of fat—the washings, in fact, of the insoluble fatty acids.

The process which I have described (*Analyst*, XII, February) for the estimation of methyl in the presence of ethyl-alcohol, and which consists in the measurement of the quantity of bichromate reduced, is, as I hope to show, particularly suitable for the analysis of such washings.

One part of glycerin requires, for complete oxidation, 7.486 parts of potassium bichromate.

Solutions required.—(1.) Bichromate, containing in each litre about 80 grammes of bichromate and 150 c.c. of strong sulphuric acid. The exact value of the solution should be ascertained by titration with solutions of known weights of iron wire.

2. Ferrous and ammonia sulphate containing about 120 grms. per litre.

3. Bichromate ten times more dilute than the above.

¹Read at the meeting of Public Analysts, February 9th, 1887; reprinted from *The Analyst*, xii. 44.

The ferrous solution is exactly standardized upon the chromate solution, and the glycerin value of the chromate (contents of $K_2Cr_2O_7$ divided by 7.486) is calculated.

The chromate solution used in my experiments standardized as follows:—

2.8412 grms. iron-wire = 2.8327 pure iron, required 33.94 c.c. bichrome. 1 c.c. = .07333 bichrome, or .009796 glycerin.

2.7078 grms. iron-wire = 2.6997 iron used 32.3 c.c. bichrome. 1 c.c. = .07344 bichrome, or .009810 glycerin. Average 1 c.c. bichrome = .07338 grms. bichrome or .009803 glycerin.

Test experiments.—Glycerin, specific gravity 1.2572, containing according to Lenz's tables, 95.55 per cent. of pure anhydrous glycerin—was taken, a solution of 12.5798 grms. per litre, corresponding to 12.0200 grms. of pure glycerin, being used. 25 c.c. of this solution, equal to .3005 glycerin were taken in each of the following experiments.

25 c.c. heated with 40 c.c. bichromate, without further dilution for two hours to near the boiling point: 30.41 c.c. bichromate were consumed, corresponding to .2981 grms. glycerin, or 99.2 per cent. of the glycerin taken.

25 c.c., heated with bichrome and 25 c.c. strong hydrochloric acid for one hour, consumed 31.16 c.c. bichrome, equal to .30546 grms. or 101.6 per cent.

25 c.c., diluted with 500 c.c. of distilled water, reduced in three hours 23.93 c.c. bichromate, equal to .23458 grms. or 78.1 per cent. of glycerin.

The same quantity, diluted with 500 c.c. of water, plus 25 c.c. strong hydrochloric acid, heated for one hour, reduced 22.3 c.c. bichrome, indicating .2186 grms., or 72.7 per cent.

25 c.c., diluted with 500 c.c. of water, plus 25 c.c. sulphuric acid, consumed in one hour 29.34 c.c. bichrome, = .2876 grms., or 95.7 per cent. of the glycerin taken.

Conditions the same as in the previous experiment, only the heating continued for two hours. Bichromate consumed 29.89 c.c. = .2930 grms., or 97.5 per cent. of glycerin taken.

25 c.c. were diluted to about 300 c.c., the solution evaporated to about one half upon the water-bath, and then heated with 25 c.c. strong sulphuric acid and chromate. After two hours 30.54 c.c. bichromate were found to be reduced, corresponding to .2994 grms. or 99.6 per cent. of glycerin.

In a similar experiment the diluted solution was vigorously boiled down over the naked flame to about one half (the basin being, of course, covered with a dock glass to prevent loss by spurting), and heated for two hours with sulphuric acid and bichromate. Found 2961 grms. or 98.5 per cent. of the glycerin taken.

In a precisely analogous experiment 10 c.c. of strong alcohol were added to the water, before boiling, over the naked flame. After two hours 30.33 c.c. of chromate were reduced, equal to 2973 grms. or 98.9 per cent. of glycerin found.

The alcohol experiment repeated, but the fluid concentrated on the water bath, an amount of bichromate was reduced corresponding to 107.6 per cent. of glycerin. An odor of aldehyde was perceptible during the oxidation.

Deductions.—From these test experiments the following conclusions can be drawn :

1. In a fairly concentrated solution glycerin is quantitatively oxidized by acid bichromate ;
2. In a very dilute solution the oxidation is not complete even after many hours' heating ;
3. The addition of hydrochloric acid does not materially help oxidation ;
4. In solutions containing about 10 per cent. of strong sulphuric acid the oxidation is complete after two hours, even in exceedingly dilute solutions (6 glycerin per 1000 of fluid) ;
5. *From such dilute solutions, glycerin does not, as is commonly assumed, volatilize on concentrating the fluid, be it on the water-bath or over the naked flame ;*
6. Should alcohol be present it is completely volatilized by vigorously boiling the fluid down to one half, but not on the water-bath.

The non-volatility of glycerin from dilute solutions may further be readily demonstrated by distilling from a large retort 500 c.c. of water, containing about .3 grms. of glycerin, catching the first 250 c.c. of the distillate. This distillate does not, even on heating, decolorize more than a few drops of a dilute permanganate solution, such as is used in water analysis.

Method for estimating glycerin in fats.—Saponify about 3 grms. of the fat with alcoholic potash ; do not drive off all the alcohol, lest glycerin should volatilize from the concentrated solution, but dilute

to about 200 c.c.; decompose the soap with dilute sulphuric acid, filter off, and estimate insoluble fatty acids as usual. Vigorously boil the filtrate and washings (amounting to about 500 c.c.) in a covered beaker or basin, down to one half, add 25 c.c. strong sulphuric acid (suitably diluted) and 50 c.c. standard bichromate. Heat to near boiling for two hours, and titrate back the excess of bichromate with excess of ferrous sulphate, and ultimately the latter with decichromate using ferrieyanide as indicator. Calculate from the chromate consumed the amount and percentage of glycerin.

Finally, I will add a few results obtained on applying the method to a few fats:

Olive oil..	10.26 per cent. glycerin.
Cod liver oil.....	9.87 per cent.
Linseed oil.....	10.24 and 10.20 per cent.
Butterine.....	10.01 per cent.
Butter.....	12.40 and 11.96 per cent.

Of course, I am fully aware that other substances, should they be present, might reduce bichromate as well as the glycerin does. The analogous objection applies to Dr. Muter's and Mr. Fox's processes; I have, however, convinced myself that soluble fatty acids, like butyric, do not act upon bichromate, nor do fatty acids of higher molecular value.

The method may not be theoretically perfect, but it may commend itself for its simplicity and rapidity in cases of fluids which cannot contain anything but glycerin and soluble fatty acids.

QUANTITATIVE ESTIMATION OF GLYCEROL.¹

By R. DIEZ.

The methods hitherto employed for the estimation of glycerol in wine and beer consist in dissolving it out usually by alcohol and ether from a mixture of the beverage with chalk, and finally weighing the glycerol. Neubauer and Borgmann (1879) found that the glycerol so obtained contained 2 per cent. of mineral constituents and 0.4 per cent. of nitrogen. Champion and Pellet (1873) devised a method in which

¹Zeit. physiol. Chem., xi., 472-484. Reprinted from Jour. Chem. Soc., August, 1887, p. 750.

the glycerol was obtained as nitroglycerol, and weighed in this form, but this and other methods are also liable to error. The present method is one in which the compounds of glycerol with benzoyl are weighed. There are three benzoates of glycerol, according as to whether one, two, or three atoms of the hydrogen of the latter are replaced by the group $C_7H_5O_2$. The following gives the method of procedure:—Glycerol was diluted to a known extent with water (0.1 gm. in 10 or 20 c.c.); 5 c.c. of benzoic chloride and 35 c.c. of sodium hydroxide added; this mixture was cooled and shaken for ten or fifteen minutes. The benzoyl compound which separated was collected on a weighed filter, washed with water, dried at 100° , and weighed. A mean of eight estimations gave the amount of the compound as 0.385 gm. In a second series of four estimations, the number obtained was rather higher, the mean being 0.395 gm.; in these cases the alkaline filtrate was shaken a second time with benzoic chloride and sodium hydroxide; the second filtrate contained hardly a trace of glycerol. These numbers formed a basis for the subsequent analyses, and showed that the compound formed in this way was chiefly the tri-benzoate; theoretically the amount of that compound for 0.1 gm. of glycerol would be 0.439 gm. Tables of the amount of glycerol in various forms of beer and wine, estimated by this method, are given, the numbers obtained being somewhat less than those given by Borgmann. The method has the following advantages: The substance weighed is solid and not hygroscopic, and admixture with inorganic and nitrogenous substances is avoided.

BARIUM PHOSPHATES—THEIR APPLICATION IN ACIDIMETRY.¹

BY A. VILLIERS.

Phosphoric acid is bibasic when phenolphthaleïn is used as an indicator, and can be titrated with a solution of potassium or barium hydroxides. Other free acids, such as hydrochloric, sulphuric, acetic, can be titrated in presence of phosphoric acid by means of potassium hydroxide, but not with baryta.

Joly has already shown that when barium chloride is added to diso-

¹ *Compt. rend.*, civ., 1104–1106. Reprinted from *Jour. Chem. Soc.*, August, p. 701.

dium phosphate the solution becomes acid, but the author gives a somewhat different explanation of the phenomenon.

If the acid solution produced by mixing solutions of disodium phosphate and barium chloride is mixed with phenolphthaleïn, and then with baryta solution, the addition of the first few drops of the alkali causes a somewhat rapid appearance of the red color, but after five or six minutes this disappears, and a somewhat considerable quantity of baryta is necessary for the production of a persistent coloration. The volume of baryta solution required to produce the second end reaction varies with the proportions of barium chloride and disodium phosphate.

In presence of a large excess of disodium phosphate, the precipitate after washing and drying at 120–130° is constant in composition; it is barium sodium phosphate, BaNaPO_4 . Its formation takes place in two stages, the first of which is represented by the equation $\text{Na}_2\text{HPO}_4 + \text{BaCl}_2 = \text{BaHPO}_4 + 2\text{NaCl}$. The acidity of the liquid at this stage is due to the formation of a small quantity of tribarium phosphate, and the consequent liberation of free acid. In the second stage, the barium hydroxide acts on the barium hydrogen phosphate in presence of sodium chloride, with formation of barium chloride, water, and barium sodium phosphate.

Barium sodium phosphate has previously been obtained in hydrated crystals by Schulten (1883) by the action of sodium phosphate on sodium silicate and barium hydroxide. It can also be prepared in an amorphous and less pure condition by the action of barium hydroxide on a solution of disodium phosphate, and in small quantity by adding barium chloride to a solution of trisodium phosphate, but it can only be obtained in a state of purity by the method described above.

Tribarium phosphate is obtained only by pouring sodium phosphate into a solution containing a large excess of baryta.

Barium hydrogen phosphate which has been precipitated for some time, and has become cry-talline, is not readily converted into the double phosphate, a proof of the alteration which the precipitate undergoes in course of time.

From these facts it is evident that free acids cannot be accurately titrated by means of baryta in presence of disodium phosphate, and this is true also of the titration of phosphoric acid in presence of alkaline salts. Accurate estimations can, however, be made in either case by means of potassium hydroxide solution.

PREPARATIONS OF DIGITALIS.

Why are preparations of digitalis frequently inert?—Kobert, of Dorpat, answers this question as follows in an article reporting a number of experiments upon digitalis:¹ “What form of digitalis shall be employed? Most commonly preferred is the infusion. This naturally contains only those substances soluble in water. Of the three important active principles digitalein, a drug which produces dilatation of the vessels of the kidneys, is soluble in alcohol, it is contained in the tincture and alcoholic extract. The other constituents, digitoxin and digitalin, are also soluble in alcohol; in alcoholic preparations, as well as in the leaves themselves, we obtain the three important active principles. In fluid extracts digitoxin is precipitated as an insoluble powder. *Acetum digitalis* (vinegar of digitalis) approaches the infusion most closely in regard to its contents. It is very desirable that fresh, well-dried leaves be used. When the leaves are imperfectly dried, a species of fermentation may occur which may decompose the three essential components of the drug, for digitalin and digitalein are, like all glucosides, decomposable through foreign matter and fermentation. Digitoxin is, however, not a glucoside, but decomposes as easily and under the same circumstances as the others. The result of the decomposition of digitalis is not a substance producing the desired effects upon the heart, but a resin, digitaliresin (from digitalein and digitalin) and toxiresin (from digitoxin). The effect of these bodies is a violent irritation of the convulsive centres of the brain; severe convulsions may also occur, as in poisoning with picrotoxin or *cicuta virosa*. Whenever the usual effects of digitalis are wanting, or instead cramps occur, we are safe in thinking that the preparation used was a poor one. The decomposition of digitalis may occur not only in the leaves, but also in infusions and solutions of digitalin and digitalein. As Tardieu says, ‘The pure digitalein when suspended in water or dissolved, undergoes decomposition in a short time, whereby the bitter taste is altered, and, as an indication of a radical change in the constitution of the drug, gases form.’ Among my patients I have very often seen decomposition in preparations of digitalis which had stood two days in a room. This happens from the mixing of digitalis tincture with syrup or watery solution. The practice prevalent in America of not preparing the drug from the leaves when desired, but of using a concentrated infusion, explains the frequent disappointment in its use.”

¹ *Therap. Gazette*, June 15; *Med. News*, July 23, 1887.

NATURAL EUCALYPTATED HONEY.¹

Dr. Thomas Caraman, in a paper read before the Académie de Médecine, January 25th, 1887 (*Le Progrès Médical*, April 16th, 1887), says that on May 25th, 1884, M. D. Guilmeth, the French explorer and naturalist, then in Tasmania, in the centre of Australia, came upon a large opening traversed by a shallow stream of water, upon the banks of which grew eucalyptus trees of from 260 to 390 feet in height. He noticed in the topmost branches of one of these trees an odd-looking dumpy hut with a dome-like roof, whose brownish exterior recalled the mud-coverings of our own country. It was 3 P. M., and the thermometer stood at 64° F. in the shade. Unable to make out what it was, and it being impossible to climb the tree, he determined to wait and watch. About 4.30, he heard a continued far off buzzing sound and saw an immense swarm of black insects, smaller than our bees, flying around an opening in the hive. These bees were of a kind unknown to him. He had seen the Australians when sick sweeten their beverages with a kind of honey which had not attracted his attention. Consequently, the discovery awakened his interest, and he set two carpenters to sawing down the tree, which was finished the next day. The tree was nearly twenty-three feet in diameter. When the tree fell, M. Guilmeth and some of his attendants, having covered their faces and hands, advanced towards the hive, beating upon the tambourines of the country. The queen soon flew away followed by most of her subjects. M. Guilmeth examined the honey, and found that it was charged with the active principles of the eucalyptus. He collected 3,500 kilogrammes of honey. He has cut down trees in which were hives or nests weighing 6,000 kilogrammes and yielding 5,000 kilogrammes of honey.

We have not been able to find a description of this black bee. He calls it the *Apis nigra-mellifica*. It is black and small; its tongue or trumpet appears to be much more developed than that of our working bees of France and Algiers. He has attempted, without success, to domesticate it in Tasmania. It has also been attempted to make the bees of Algiers swarm in the neighborhood of eucalyptus plantations, and by this rational means to obtain a particular honey. The native bees, however, when they have access only to the flowers and leaves of the eucalyptus, die one by one.

¹Translated by R. M. Slaughter, M. D. Reprinted from *Virginia Medical Monthly*, July.

When passed through a medium sieve at a temperature of 68° F., the honey presents the appearance of a rather transparent, syrupy, thick, homogeneous liquid of a deep orange color. Its odor, *sui generis*, reveals immediately its nature and special composition—plainly that of the eucalyptus. It is very soluble in water, milk, and the native wines, but much less so in alcohol. Its fermentation is very difficult on account of the large proportion of sugar, about 612 grammes to the kilogramme.

It contains to the kilogramme, reducent sugar (principally levulose), 611.6 gms., water 215.6 gms., active principles (eucalyptol, eucalyptene, terpene, cymol, odorous, resinous and coloring matters), 171 gms. Its density is 1.44.

A striking fact is the enormous quantity of absolutely pure sugar, and the contained active principles, giving the honey a very considerable therapeutic value. The eucalyptol as extracted from this honey is a white, slightly amber-colored liquid, and almost opaque. The other principles form a grey-brown, opaque mass with a special odor, which differs from that of the eucalyptol. An attempt to make an artificial honey by combining the principles in the same proportion, as indicated by the analysis, with the honey of Narbonne failed entirely.

In experiments upon animals, the honey produced a marked and quite lasting reduction of temperature. Upon man in good health, it produces the following effects: A tablespoonful taken in a little hot water or milk makes a delightful drink; a few minutes after taking it an agreeable glow pervades the whole system. In half an hour a portion of the active principles begin to be eliminated by the bronchi and larynx, and the voice becomes clearer and more sonorous, and the breath perfumed. It seems, also, that the lungs are more elastic, more supple. If the honey is continued in tablespoonful doses four times daily for a week, the weight increases considerably, as also do the powers of endurance (lung power). At the same time, there is a slight diuresis with augmentation in amount of urea, with a pronounced odor of the urine like that of the cassia rather than of the violet.

Physiological action.—1st. The natural eucalyptated honey is a valuable aliment, containing as it does 612 gms. per 1,000 of pure sugar, and may replace cod-liver oil in chronic bronchial trouble, and in scrofulous and strumous troubles. 2nd. It is anti-catarrhal and a

cardiac sedative, having an action upon the heart like digitalis. Upon the bronchial mucous membrane it acts as a moderator of the secretions and as an anti-proliferator (pardon the word) of the epithelium cells. 3rd. It is a febrifuge, and, 4th, an anti-putrid parasiticide. 5th. It is anti-blennorrhagic, the active principles eliminated by the urine, acting more powerfully than copaiba and oil of sandal-wood.

It may be taken in water or milk, or spread upon bread. Locally he has used it as an injection, dissolved in the decoction of dulcamara, with excellent results.

VARIETIES.

Belladonna against iodism.—M. Aubert, of Lyons (*F. Plan. Lyon*, 120, p. 14), finds that the coryza and other troubles which are caused by the administration of iodide of potassium to those who are intolerant of it, may be prevented by the simultaneous exhibition of belladonna. He records a case in which the iodide, both in small and large doses, caused the usual symptoms of iodism, and after long-continued administration of the drug tolerance was in no way established. As soon as "pilules of belladonna" were given with the iodide, the unpleasant effects were no longer felt. Aubert affirms that the tolerance sometimes continues when the belladonna is omitted.—*Med. Chronicle*.

Cocaine as an antidote to strychnine.—Bignon ("Genio Med. quir.") finds, as the result of experiments on dogs, that hypodermic injections of cocaine, kept up until the strychnine has been eliminated, prevent a fatal result in cases where the dose of strychnine administered is not excessive, and retard it when large doses are used.—*N. Y. Med. Jour.*, Aug. 13.

Influence of infused beverages on digestion.—Dr. James W. Fraser has studied experimentally the action of our common beverages on gastric and intestinal digestion. (*Jour. Anat. and Physiol.*) These are his conclusions: (1) It is better not to eat most albuminoid food-stuffs at the same time as infused beverages are taken, for it has been shown that their digestion will in most cases be retarded, though there are possibly exceptions. Absorption may be rendered more rapid, but there is a loss of nutritive substance. On the other hand, the digestion of starchy food appears to be assisted by tea and coffee; and gluten, the albuminoid of flour is the principle least retarded in digestion by tea, and it only comes third with cacao, while coffee has a much greater retarding action on it. From this it appears that bread is the natural accompaniment of tea and cacao when used as the beverage at a meal. Perhaps the action of coffee is the reason why it is usually drunk alone or at breakfast—a meal which consists much of meat, and of meats (eggs and salt meats) which are not much retarded in digestion by coffee. (2) Eggs are the best form of animal food to be taken along with infused beverages. Apparently they are the best lightly boiled if tea,

hard-boiled if coffee or cacao, is the beverage. (3) The casein of the milk and cream taken with the beverage is probably absorbed in a large degree from the stomach. (4) The butter used with bread undergoes digestion more slowly in presence of tea, but more quickly in presence of coffee or cacao; that is, if the fats of butter are influenced in a similar way to olein. (5) The use of coffee or cacao as excipients for cod-liver oil, etc., appears not only to depend on their pronounced tastes, but also on their action in assisting the digestion of fats.—*Med. and Surg. Rep.*

Hand-grenades.—Some excellent suggestions concerning these high-priced appliances for extinguishing incipient fires are quoted in *Building from Chamber's Journal*. "Though undoubtedly the saline solution with which they are filled is somewhat more efficient for the purpose for which they are intended than pure water, there is no reason why a householder should not manufacture his own hand-grenades, and, by so doing, save an unnecessary outlay of money. The hand-grenade solution recommended is a mixture of 19.47 parts common salt, 8.88 parts salammoniac, and 71.66 parts water. It is entirely unnecessary to compound the mixture with any such exactness, as a rough approximation to the proportions given will give practically the same results. Having prepared this solution, the next thing is, to provide suitable receptacles for it, and place them about the house. Ordinary quart bottles are made of too heavy glass, and do not readily break when thrown at a fire; neither are they of suitable shape for the purpose. The glass flasks used by chemists make excellent hand-grenades, for they are of thin glass, and hold just about the right amount of fluid. The principal objection to them is their cost, but the combined cost of such flasks and the solution for filling them is much below the current price of hand-grenades. There are certain kinds of wine-bottles also which might be used advantageously, as the only necessary feature is thinness of glass, so that the grenade will surely break when thrown at a fire. The bottle or flask should, of course, be stoppered; and it were well to cover the corks with sealing-wax, so as to prevent any loss by evaporation."

PHARMACEUTICAL COLLEGES.

The Department of Pharmacy, University of Kansas, had its second anniversary, June 6th, when addresses were delivered by several students, by Mr. Rob. J. Brown, and by Professor Sayre, the discourse of the latter being "On Future Study." The graduating class in this department numbered fifteen.

The School of Pharmacy of the University of Michigan held its nineteenth annual commencement, in connection with the semi-centennial celebration of the University, on June 29th and 30th. The degree of Master of Pharmacy was conferred upon one, and that of Pharmaceutical Chemist upon twenty-nine students. The Alumni Association elected Prof. A. B. Stevens, Ann Arbor, president; T. A. Reyer, Detroit, secretary, and A. C. Schumacher, Ann Arbor, treasurer.

The Chicago College of Pharmacy held its twenty-third commencement at the close of the summer session in Attfield Hall of the college building, August 4th, when the degree of Graduate in Pharmacy was conferred upon twelve gentlemen and two ladies. Addresses were delivered by Mr. G. P. Engelhard, Prof. Garrison and W. M. Jewell, Ph.G. The senior prize was awarded by Prof. Bastin to A. Emil Hiss, and the junior prize to E. A. Sayre.

PROCEEDINGS OF STATE PHARMACEUTICAL ASSOCIATIONS FOR 1887.

Alabama, pp. 27.—See July number p. 369. Next meeting in Selma, May 8, 1888; Geo. A. Cunningham, Local Secretary.

Connecticut, pp. 112.—See June number p. 315. Next meeting in Willimantic, February 7, 1888; F. M. Wilson, Local Secretary.

Louisiana, pp. 75.—See June number p. 315. Next meeting in New Orleans, April 11, 1888; Mrs. E. Rudolf, Corresponding Secretary.

Nebraska, pp. 127.—See June number p. 316. Next meeting in Lincoln, May 8, 1888; W. C. Lane, Local Secretary.

New York, pp. 250.—The meeting was held at the Thousand-Island Park, June 21-23. Committee reports on adulterations and unofficial formulas were read; also the following papers: "Parts by Measure," by C. W. Holmes; "Syrup of Hydriodic Acid," by D. C. Cameron; "Upright Condensers," by L. F. Stevens; "The Action of Boric Acid on Microbes," by Dr. R. G. Eccles; "Ice Water vs. Distilled Water, for Pharmaceutical Preparations," Dr. Eccles; "Extract of Vanilla" and "Relative Business Relations," by C. W. Holmes. The officers are: A. Sager, Cortland, president; J. H. Smith, R. E. Phillips and W. Whitney, vice-presidents; Clay W. Holmes, Elmira, secretary; C. H. Butler, Oswego, treasurer. The next meeting will be held in Catskill, June 19, 1888; G. A. Dykeman, Local Secretary.

Virginia. Pp. 103. See July number, p. 376. Next meeting in Danville, May 1st, 1888; F. Clark, Local Secretary.

EDITORIAL DEPARTMENT.

Pharmaceutical Examining Board of Pennsylvania.—A circular letter has been issued to all retail druggists and apothecaries, proprietors as well as assistants, with the notification to register in conformity with the law within ninety days from the date of the official notice, August 20. The time for registration without examination will expire November 18, and the Board has no power to extend it.

The Board will meet in Pittsburg, September 28, when the first examination will probably be held. Applications are to be directed to the secretary, H. B. Cochran, Lancaster.

Remedy for rhus poisoning.—The following correspondence is contained in *Popular Science News* for June:

"I have always been extremely susceptible to the poison of poison-ivy and oak so as to give me great annoyance, unless it is immediately checked on its first appearance. This common washing-soda accomplishes for me, if properly applied. I make the application by saturating a slice of loaf-bread with water, then cover one surface with soda, and apply to the eruption, the soda next the flesh. When the bread is dried by the animal heat, I drop water on the outer side so as to keep it thoroughly moistened, and dissolve the soda crystals in contact with the skin. This, you will perceive, is merely a bread poultice; the bread being a vehicle through whose moisture the soda reaches the humor. I find that the washing or bathing with soda water, even continuously will not suffice with me. My skin requires the heat and moisture of the bread in order for the soda to act on and neutralize the poison. I rarely have need to retain this soda poultice for more than thirty minutes on any affected part. No pain ensues. Formerly I suffered often for weeks, as the poison would spread all over my body. Now thirty minutes measure the duration of its exhibition."

We have tried this remedy in the case of a child with an eruption five days old, and of such severeness that the fingers could not be bent. The sodium carbonate was scraped upon the soaked bread and applied for half an hour, when the pain had subsided and all the joints could be freely used. Another application was made the next morning, and this terminated the attack. In another case, where the eruption had appeared in the face, the remedy acted with equal promptness.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Practical Urine Testing.—A Guide to Office and Bedside Urine Analysis, for Physicians and Students. By Chas. Godwin Jennings, M.D., Professor of Chemistry and of Diseases of Children, Detroit College of Medicine, etc., Detroit. D. O. Haynes & Co., 1887. 12 mo. pp. 124.

The first part of this little work treats of the physical characters, the normal constituents and the abnormal constituents of urine, the causes of change or variation by physiological and pathological conditions being briefly pointed out. The second part is divided into five chapters on qualitative analysis, quantitative analysis, microscopical examination, analysis of calculi, apparatus and reagents. While in part 1 the relative utility of the various tests and methods of testing is briefly discussed, part 2 gives the practical application of the most reliable and convenient tests in systematic order, without relating to physiological or pathological influences. A portion of the eighteen cuts illustrate certain apparatus, while the larger number show the appearance under the microscope of urinary sediments and of the results obtained by the application of tests.

In all cases examined by us, we have found the directions clear, concise, and reliable, and we cheerfully recommend the work as a valuable outline of urinalysis, adapted to the needs of the physician as well as of the pharmacist, who is frequently called upon for the examination of urine and urinary deposits.

What to do in Cases of Poisoning.—By Wm. Murrell, M.D., F.R.C.P. Lecturer on Pharmacology and Therapeutics in the Westminster Hospital, etc. First American from the fifth English edition. Edited by Frank Woodbury, M.D., Fellow of College of Physicians of Philadelphia, etc. Published by the Medical Register Co., Philadelphia, 1887. 12 mo, pp. 158.

The general diagnosis of cases of poisoning, based upon the most striking symptoms, opens the introductory portion of this little volume, which also enumerates the poisonous ingredients known or supposed to be present in a number of popular nostrums. A source of possible poisoning is pointed out from the slow solubility of certain pill coatings; if pills containing active ingredients have been taken repeatedly, the coating of several may be dissolved under specially favorable circumstances, and thus the effects of an unusually large dose of the poison may be produced. The antidote cases of various manufacturers are described, and the different emetics and other means of treatment, and subjects relating to poisoning, are briefly discussed in the introductory part.

The greater portion of the book is devoted to the poisons, which are arranged in alphabetical order, and are usually considered under the following headings: How taken, symptoms, diagnosis, fatal dose and treatment. All these points are concisely discussed with the view of practical application in cases of emergency, greater prominence being, as a matter of course, given to those poisons most commonly used.

The work is thoroughly practical, and will doubtless be as well appreciated in this country as it has been in Great Britain, since the American editor has rendered the nomenclature and formulas in harmony with our pharmacopœia, and has made some other changes intended to increase its usefulness on this side of the Atlantic.

A Compend of Pharmacy.—By F. E. Stewart, M.D., Ph.G., etc., Philadelphia. P. Blakiston, Son & Co.

We again refer to the new edition of this work for the purpose of stating that it may be obtained interleaved, as we suggested on p. 379 of our July number, so as to serve as a convenient note-book. For this purpose it would be still further improved, we think, by the omission in the first two parts of the questions preceding the text proper.

Twenty-third Annual Report of the Alumni Association, with the exercises of the 66th Commencement of the Philadelphia College of Pharmacy, for the year 1886-1887. 8vo, pp. 242.

This pamphlet contains the minutes of the Executive Board and of the annual meeting, most of the lectures delivered at the social meetings, obituary notices, interesting correspondence, commencement exercises, etc. It may be obtained from the efficient secretary, Wm. E. Krewson, Ph.G.

American Medicinal Plants.—An Illustrated and Descriptive Guide to the American Plants used as Homœopathic Remedies, their History, Preparation, Chemistry and Physiological effects. By Chas. F. Millsbaugh, M.D.

Illustrated by the author. Boericke & Tafel, New York and Philadelphia. Fascicle vi. Price \$5.

The fascicle before us completes this work, which has been in preparation for several years. In our previous notices we have spoken of the scope of the work, its general arrangement, and the character of the illustrations as well as of the descriptions and statements relating to composition, and we find that the good and indifferent qualities have been pretty uniformly preserved throughout the work.

In our opinion, the usefulness of the work depends chiefly upon its value as relating to medical botany. The well-executed plates give fair and correct representations of the plants, which are colored as nearly true to nature as can reasonably be expected. In a few cases we would have preferred drawings more characteristic of the entire plants, but even in these cases we have no fault to find with the general correctness. The botanical descriptions are pretty complete, though perhaps briefer than some may desire who have paid but little attention to our wild growing plants; as a rule, they are ample for enabling an intelligent person to identify the plants. We have previously stated that a considerable proportion of the plants, thus illustrated, are not indigenous to American soil, but have become naturalized here more or less extensively, or are sometimes found growing spontaneously in certain localities. Pharmacognostical descriptions are omitted, except in a few instances.

In relation to the chemistry reported in the text, we have on various occasions pointed out errors, omissions and inaccuracies, or vague statements. The physiological action of the plants is usually briefly stated; but on this point we leave others to judge. However, one feature not previously referred to we must notice now, namely, the errors in the spelling of French and German names, which are of more frequent occurrence than is allowable in a work of reference. For instance, we should have raifort (not raifoot), ciguë (not ciquë), pied de lion (not pied d' leon), igname (not iguame), Bärlapp (not Bürlapp), Kolbenmoos (not Kalbenmoos), Schierling (not Scheiling), Nachtschatten (not Nachschatten), etc. A number of typographical errors occur likewise in the index.

The publishers have left nothing undone to make the work attractive, even aside from the 180 plates, which alone are fully worth the price charged for the work.

Grasses of the South.—A Report on Certain Grasses and Forage Plants for Cultivation in the South and Southwest. By Dr. Geo. Vasey, Botanist, Washington: 1887. Svo, pp. 63.

The pamphlet contains sixteen plants of southern forage plants, and has been issued by the Botanical Division of the Department of Agriculture.

Eighteenth Annual Report of the State Board of Health, of Massachusetts.—Boston: 1887. Svo, pp. 366.

The report is for the year 1886; the portions of greatest direct interest to the pharmacist are the special reports on the examination of foods by Dr.

E. S. Wood; on milk by Drs. C. Harrington, B. F. Davenport and C. A. Goessmann; and on food and drugs, by Dr. B. F. Davenport.

Massachusetts State Agricultural Experiment Station.—Bulletins No. 25^a and 26, July and August, 1887.

These reports are prepared by the Director, Prof. C. A. Goessmann, Amherst, Mass.

Bericht der Wetteravischen Gesellschaft für die Gesamnte Naturkunde zu Hanau, 1885–1887, erstattet von dem Director derselben Fr. Becker, Realschul-Director. Hanau 1887. Waisenhaus-Buchdruckerei. 8vo, pp. 169.

Report of the Wetteravian Society for the Natural Sciences.

Besides the report on the affairs of the Society, the pamphlet contains an obituary of the late Prof. Dr. C. Fliedner, and a catalogue of the plants growing wild and cultivated in the district of Rotenburg, compiled by Dr. Eisenach, from collections made during a period of nearly fifty years.

The following theses from the École supérieure de Pharmacie, at Montpellier, have been received:

“De l'eau à bord”; par Chas. Dezeuze. (Water on Shipboard.) Pp. 54, with a plate illustrating Perroy's still and filter.

“Du coffre à médicaments à bord des batiments de guerre et de commerce”; par F. X. Daniel. (Medicine chests for men-of-war and merchantmen). Pp. 48.

“Des farines employées dans la Marine au port de Toulon; fabrication, achats à l'industrie, conservation, falsification, altération, analyse”; par J. Martineng. (On flours employed in the marine at Toulon, their manufacture, purchase, conservation, adulteration, changes and analysis). Pp. 90.

“Des Anesthésiques”; par Henri Valat. (On anæsthetics). Pp. 62.

“D l'acide lactique et des lactates employés en pharmacie”; par Jacques Rouzières. (Lactic acid and lactates employed in pharmacy). Pp. 54.

“Des contre-poisons”; par J. Carles. (On counter-poisons). Pp. 64.

“De l'opium des fumeurs”; par René Pluchon. (On smokers' opium). Pp. 66.

“Étude sur le mabit et le quinquina Piton”; par Chas. Arnaud. (On the mabit (*Cuburina reclinata*) and the Piton cinchona (*Exostemma floribundum*). Pp. 36, with a plate illustrating the anatomy of the exostemma bark.

The reception of the following pamphlets is hereby acknowledged:

Kinologische studien; door Dr. J. E. De Vrij. (Quinological studies). Five numbers.

Composition du beurre naturel; par D. A. Van Bastelaer. (Composition of natural butter).

Les anciens grès artistiques flamands dans le nord de la France a la fin du XVII^e siècle; par D. A. Van Bastelaer. (Ancient Flemish artistic earthenware in the north of France, at the end of the 17th century). Pp. 26, with a colored plate.

Instructions sommaires pour les agents de la police répressive en matière d'exercice illégal des professions médicales; par D. A. Van Bastelaer. (Summary instructions for the agents of repressive police, relating to the illegal practice of the medical professions). Pp. 45.

Address of Fr. B. Kilmer, President, at the 17th Annual Meeting of the New Jersey Pharmaceutical Association.

Studies on the Stratification of the Anthracite Measures of Pennsylvania. By H. A. Wasmuth, Instructor of Mining, University of Pennsylvania. Pp. 18, with four plates of geological sections; reprint from the Journal of the Franklin Institute.

A Successful Case of Partial Incision of the Larynx. By Lennox Browne, F. R.C.S. Ed. etc. Pp. 7; reprint from the British Medical Journal.

A Review of the most Important Advances in Surgery, Medicine and Pharmacy in the Last Forty Years. By C. W. Moore, M.D., San Francisco. Pp. 16; reprint from the Pacific Record of Medicine and Surgery.

OBITUARY.

Notice of the death of the following graduates of the Philadelphia College of Pharmacy has been received:

Wm. G. Barrowman, class 1886, died at Moosic Lake, Pa., July 30th, of consumption, at the age of 21 years. He learned the business in Scranton, and after graduation was assistant in Wilkes Barre.

John P. Curran, Jr., class 1879, died at his residence in Philadelphia, August 6th, of consumption. Until about three months ago he was in business at Thirteenth and Jefferson streets.

Allen Wesley Hauck, class 1886, died in Santa Fe, New Mexico, July 27th. He was a native of Lebanon, Pa., and in his new western home had made many firm friends. While charging a soda-water fountain the apparatus exploded, wounding him so seriously that in a short time he bled to death. His body was sent to his former home.

Chas. H. McConnell, class 1886, died suddenly of congestion of the brain, July 22. He was in business in West Philadelphia with D. F. Shull & Co. as a partner.

Wm. D. Porter, class 1887, lost his life at Mahanoy Junction, Pa., while endeavoring to rescue a companion from drowning. He had been assistant in the store of Dr. C. Frueh for some time.

George S. Speaker, class 1879, died after a short illness of typhoid fever August 25th, aged 29 years. He graduated at the Boys' High School in 1875, and since that time was in the service of Mr. Whittam, Chestnut Hill, in this city.

THE AMERICAN JOURNAL OF PHARMACY.

OCTOBER, 1887.

ANALYSIS OF ARISTOLOCHIA RETICULATA, *Nuttall*.

BY JAMES ADAMS FERGUSON, Ph. G.

[Abstract from a thesis.]

The drug was reduced to a number eighty powder. The moisture present was determined to be 10.70 per cent., and the inorganic constituents 11.40 per cent.; the ash contained carbonic, phosphoric and sulphuric acids, yielded to water 1.85 potassium salts, and to hydrochloric acid 3.35 salts of calcium, magnesium and iron, the undissolved, 6.20, being silica.

The extract obtained with petroleum spirit (boiling point $45^{\circ}\text{C}.$.) lost on heating to $105^{\circ}\text{C}.$ one per cent. of volatile oil; the residue left was soft, resinous, fused at $66^{\circ}\text{C}.$, was soluble in chloroform and benzol, and partly soluble in absolute alcohol.

The ether extract was soft, greenish-brown, resinous, slightly bitter, of an agreeable odor; spec. grav. 1.10; melting point $66^{\circ}\text{C}.$; soluble in absolute alcohol, chloroform and benzol; imparting to water an acid reaction; colored red-brown by H_2SO_4 , and yellow-brown by HNO_3 .

The extract with absolute alcohol, yielded to water nearly one half its weight (.85 per cent. of the drug), of soluble matter, the solution contained tannin, and gave precipitates with platinic chloride, phosphomolybdic acid, auric chloride and potassio-mercuric iodide. The tannin was determined in a fresh portion of the drug, by weighing the gelatin precipitate, occasioned in a decoction, in the presence of alum. The portion of the alcohol extract insoluble in water was weighed as phlobaphene.

The water extract, after deducting the ash (2.20 per cent.), weighed 8.00 per cent.; gum and dextrin were removed by successive precipitation with alcohol; malic acid was determined by precipitation with lead acetate, decomposition by H_2S , and precipitation with calcium-

chloride and alcohol. The glucose was estimated from the cuprous oxide obtained in alkaline solution, by igniting it and multiplying by .45.

From the soda extraction the albumen was precipitated by acetic acid and alcohol; the portion remaining in solution was weighed as extractive matter, after deducting the sodium acetate present.

The decoction with dilute hydrochloric acid when neutralized with ammonia and precipitated by alcohol, yielded pararabin. The starch was calculated from the glucose, and the calcium oxalate was determined by precipitating the decoction with sodium acetate, igniting the precipitate and weighing as CaO.

The results of the proximate analysis are tabulated as follows:

PROXIMATE ANALYSIS.		
Soluble in petroleum spirit.....	4.20	
Volatile oil.....		1.00
Resin.....		3.20
Soluble in stronger ether.....	1.90	
Resin.....		1.90
Soluble in absolute alcohol.....	1.80	
Aristolochine, (approximately) soluble in water.....		.03
Tannin, soluble in water.....		.82
Phlobaphene .....		.95
Soluble in distilled water.....	8.00	
Mucilage.....		.60
Dextrin.....		.80
Glucose.....		.72
Malic acid and extractive matter.....		5.88
Soluble in caustic soda solution (0.2 per cent.).....	3.10	
Albuminoids.....		.60
Extractive matter.....		2.50
Soluble in diluted hydrochloric acid (1 per cent.).....	24.40	
Pararabin.....		1.80
Starch.....		6.48
Oxalate of calcium.....		.53
Albuminoids and extractive matter.....		15.59
Loss by chlorine treatment.....	5.78	5.78
Residue ..	23.09	
Cellulose and lignin.....		23.09
Ash.....	11.40	11.40
Moisture.....	10.70	10.70
Loss.....	5.63	5.63
	100.00	100.00

Volatile oil.—Ten pounds of the drug were distilled with water, and about one and a half fluid-ounces of volatile oil obtained. It was

of an amber-yellow color, aromatic odor, and camphoraceous taste; sp. gr. .975; boiling point, $205^{\circ}\text{C}.$; did not congeal after keeping at $-15^{\circ}\text{C}.$ for two hours.

With a solution of one part bromine, and twenty parts of chloroform, the oil became colorless; with concentrated sulphuric acid, deep brown color, changing to red; with fuming nitric acid, reddish-brown. An ethereal solution of bromine (Prof. Maisch's test) was decolorized, then the oil changed to a greenish, brown, blue, dirty brown in quantity, and purple in thin layers. Iodine caused a deep brown color in quantity, but yellowish-brown in layers. The reactions, with bromine and iodine were quiet, and afterwards the oil acquired a terebinthinate odor.

Alkaloid.—This probably is "the bitter principle" of Chevallier and Feneulle. Chevallier obtained it, by precipitating the decoction with acetate of lead, exhausting the precipitate with hot alcohol, evaporating and treating the residue with water, which dissolved out the bitter principle. Feneulle found the bitter principle in the filtrate from the precipitate occasioned in the decoction, by acetate of lead. I tried both of these methods, and found that Feneulle's method was the one that separated the alkaloid. For obtaining the alkaloid five pounds of the drug were percolated with alcohol, the tincture evaporated, and the extract treated with water slightly acidulated with sulphuric acid. The acidulated filtrate was shaken with ether and the ether separated. The aqueous solution was treated with gelatin to remove tannin. The filtrate from the tannate of gelatin was made alkaline and shaken successively with ether and chloroform, both of which dissolved a yellow amorphous body which was made to crystallize by dissolving in ether, adding a few drops of water and allowing it to evaporate over sulphuric acid, when light-yellow needle-shaped crystals were left, which on being heated with soda lime, evolved ammonia. The crystals are inodorous, very bitter, and are soluble in water, 95 per cent. alcohol, ether, chloroform and benzol.

Color tests.—With concentrated H_2SO_4 , a reddish-brown color; with fuming HNO_3 , colorless; with H_2SO_4 and crystal of $\text{K}_2\text{Cr}_2\text{O}_7$, a brown color, changing to brownish-green; with concentrated H_2SO_4 and HNO_3 , a pink color; with concentrated HCl , a pink color, and with Froehde's test, a blackish-brown color. To this alkaloid I would suggest the name of *aristolochine*, the bitter principle of *serpentaria* having been named *aristolochin* by Chevallier.

ETHYL NITRITE.

SOME EXPERIMENTS ON THE COLOR, BOILING POINT AND SPECIFIC GRAVITY.¹

BY J. GEO. SPENZER, M. D.

Last winter, while engaged in the preparation of ethyl nitrite in somewhat large quantities, the conflict of authorities and text-books upon the boiling point, color and specific gravity, which I had observed several years ago while preparing some experimentally, recurred to me, and I decided to follow a line of experiments, which, although not expecting to alter the dispute one way or another, I hoped would give a happy medium of results upon these points.

A short description of the methods used and a few criticisms on the processes may be of interest.

The methods employed were :

1. Liebig. *Liebig's Annalen*, vol. 30, p. 140.
2. Emil Kopp. *Revue Scientifique*, vol. 27, p. 273.
3. Process of *United States Pharmacopœia*, 1880.
4. Carey Lea. *Americ. Jour. Sci.*, 2nd ser., vol. 32, p. 95.
5. Grosourdy. *Journal Chimie médicale*, or *Muspratt's Chemistry*, vol. 1, p. 834.
6. Feldhaus. *Liebig's Annalen*, vol. 126, p. 71.

1. Liebig's method is the one given in many of the standard text and reference books, and, as far as I can discern, yields a product much above any of the others in purity. It is prepared by passing nitrogen trioxide (formed by heating starch and nitric acid in a capacious retort) into a Woulffe bottle containing a cold mixture of one part of 85 per cent. alcohol and two parts of water, the nitrogen trioxide passing through the alcohol, forms ethyl-nitrite, which immediately distills off and is condensed by means of a Liebig's condenser or a Mohr's worm surrounded with a freezing mixture; it is then washed with water to remove alcohol and dried over calcium chloride.

2. Kopp's method. This is recommended by Beilstein (*Beilstein, Handbuch der Organischen Chemie*, vol. 1), as forming a product which is but seldom equalled.

It is also the method used by Strecker in his researches on the ac-

¹ Read before the Ohio Pharmaceutical Association at Akron, June 8th, and communicated by the author.

tion of caustic potassa on ethyl nitrite (*Liebig's Annalen*, vol. 77, p. 331).

It is prepared by adding copper turnings to a mixture of equal parts of nitric acid and alcohol contained in a retort connected to a cooling apparatus; the action which starts up is sufficient to cause the ether to pass over without the application of external heat. It may now be either washed and dried or proceed as Kopp directs, *viz*, pass the ether in the state of vapor through a wash-bottle containing water, which in turn is connected to a calcium chloride drying-tube, and this latter to a cooling apparatus, and the pure ether collected.

3. United States Pharmacopœia Process. A mixture of alcohol, sulphuric acid and nitric acid is distilled, and the distillate washed with water.

4. Method of M. Carey Lea. Is similar to the preceding one, with the exception that ferrous sulphate is employed in place of the sulphuric acid.

5. Grosourdy uses a mixture of either nitrite or nitrate of potassium, alcohol and sulphuric acid; this he heats gently for forty-eight to seventy-two hours, when the ether distills over.

6. Feldhaus claims the following method to be the best after having tried others; it is, a mixture of potassium nitrite, water and alcohol is poured gradually into a cold mixture of alcohol, water and sulphuric acid, contained in a distillatory apparatus, heat enough is produced in the reaction to carry it through, and the ether distills off. In methods 3 and 4 some ordinary ether is produced.

In 5 a large amount of aldehyde is formed. In all the processes undecomposed alcohol passes over; this is particularly so in 5 and 3.

In 1 and 2, as Watts (*Gmelin's Handbook*) suspected, and as Schmidt and Duflos have proved, a small amount of ethyl chloride is produced when calcium chloride is used as a drying agent.

The following general method was used in purifying the products of the several methods, *viz*:

The distillate was shaken with one-third its volume of ice-water vigorously, three successive times. After the third washing, the ether was separated as much as possible by means of a separatory funnel, and the washed ether shaken occasionally in half hour with pure recently ignited potassium carbonate, allowed to settle, decanted into a dry flask, and distilled. During this treatment No. 5 alone browned the potassium carbonate used.

Color.—The weight of authority, and all the standard chemical works give the color as a light yellow.

Grosourdy and Couerbe, however, contradict this.

Grosourdy (*Journal Chimie médicale*, or Muspratt's Chemistry, vol. 1, page 835), refers the color to a hydrocarbon and says it may be removed by repeated distillation from potassium carbonate.

Some ethyl nitrite was prepared according to Grosourdy's method, following the process out in every detail, a faintly yellow straw-colored liquid was collected in the receiver; when this was shaken with ice-water, however, it at once diminished in volume and formed two layers, an upper layer of a bright yellow color the exact counterpart of ethyl-nitrite, and a lower colorless layer, a mixture of alcohol and water. This upper layer was now subjected to six distillations with potassium carbonate; the distillate kept growing lighter and lighter, until the last ones were almost colorless. The boiling point, however, had rapidly risen to 60°-78°C.; it burned and otherwise denoted its alcoholic nature. If the almost colorless liquid be shaken with ice water, or if before each redistillation, the distillates be washed with water a yellowish liquid will always separate out.

The decomposition of the ether by distillation with potassium carbonate is well known and was proven on the ethers of all the processes.

Couerbe said the color was due to an oil, which could be removed by successive distillations from sugar.

For the purpose white rock-candy was powdered and boiled with some ethyl-nitrite, made after Liebig's method, in a flask, connected with a reverse condenser for two hours, when it was distilled off, and the process continued with a fresh portion of sugar and again distilled off; this was kept up for a day, distilling four times, but no signs of a fading of color presented themselves.

BOILING POINT.

Liebig made the boiling point.....	16.4°C.
Mohr " " " "	17.5°-18°C.
Brown " " " "	16.6°-17.8°C.
Thénard " " " "	21°C. at 730 mm. barometric pressure.

Strecker (*Kurze Organische Chemie*, 2te. Auflage), gives it at 16° C.

The following method was used in determining the boiling point:

The ether decanted from the carbonate of potassium was poured into a small Wurtz fractional distillation flask, with a plain neck, around which was wrapped several thicknesses of paper; the flask was now connected to a condenser and fitted with a caoutchouc stopper, through which a thermometer passed into the liquid. In the final determinations, which represent some fifty or more, a Geissler standard thermometer was used.

The heat applied was very gentle, using the palm of the hand, while the temperature of the room in no case was above $+12^{\circ}\text{C.}$, and in the greater number of determinations was from $+3^{\circ}$ to $+4^{\circ}\text{C.}$

At first, the boiling point was secured by allowing the liquid to boil thoroughly, then allowing it to cool, and again boiling, during which the bulb of the thermometer was alternately raised to one-half inch below the orifice of the exit tube and again lowered into the liquid; this was to see whether the boiling liquid and its vapor were of the same temperature. In the majority of instances they were the same, while in a few only was there an advance of one-tenth of a degree in the boiling liquid. The readings were made as rapidly as possible and with a magnifying glass. The barometric pressure was also carefully noted.

Ethyl nitrite prepared according to one, four and five were tried in this manner.

Ethyl nitrite after No. 1, gave in the preliminary a boiling point of 16.5°C. , whilst that from Carey Lea's method gave 17°C. The mean average of all the determinations was 17°C. This comprises about seventy trials.

To conclude the boiling point determinations, some six ounces of freshly-made Liebig's ethyl-nitrite was subjected to fractional distillation.

The apparatus consisted of a Wurtz flask connected by an adapter to a Mohr's worm, which was surrounded with a freezing mixture. The heat, which was very gently applied to the flask, was sufficient to keep the liquid in a state of constant ebullition; with the thermometer in the liquid the same began boiling at 13.3°C. , when the boiling continued vigorously up to 16.3° . It required eight minutes to reach this temperature, and one and a half drachms of liquid were obtained.

The thermometer was now raised until the bulb was half an inch below the opening of the exit tube; it required fifteen minutes to

raise from 16.3° to 16.6° C. At 16.7° C. it remained for twenty-five minutes ; while it required an hour to reach above 16.8° S. Between the temperatures 16.3° C. and 16.8° C. one ounce was obtained. The rise in temperature up to 16.9° C. required one hour. When it ran up to 17° C. two ounces had been obtained. The receiver was now changed and one and a half ounces were obtained at this temperature. At 17.2° C. all of the liquid had distilled over ; the barometric pressure was 758.7 mm.

Lea's ethyl nitrite, treated in the same manner, started at 16.1° C, and ran rapidly up to 17.3° C., and finished at 17.8° C. Barometer pressure 759.2 mm.

Grosourdy's ethyl-nitrite, at 760 mm. barometer pressure, distilled between 19.38° C. and 19.88° C.

SPECIFIC GRAVITY.

This was taken at 0° C. by means of a delicate Sprengel pycnometer.

Liebig found the sp. gravity at 15° C.....	.947
Brown " " 15.5° C.....	.900
Mohr " " 15.5° C.....	.898
Dumas and Boullay found the sp. gravity at $+4^{\circ}$ C.....	.886

The mean of 6 determinations made

Liebig's ethyl-nitrite at 0° C.....	.919
Lea's " " " .....	.920

This is using the ethyl nitrite before fractioning it.

From the results of these experiments, I think it may be fair to conclude :

1st. That ethyl nitrite has, as yet, not been made colorless, and that it is light-yellow.

2d. That the boiling points, 16° to 16.5° C, are probably too low, and that 18.5° to 21° C are possibly too high ; also, that the boiling point given by most French and some German works, 17° C., is the nearest correct.

3d. The specific gravity of .947 at 15° C., is undoubtedly too high, as it has not been corroborated ; that .886 at $+4^{\circ}$ C. is too low, and that .900 at 15.5° C. is nearest and about right.

It is unfortunate that most of the authorities do not say which method was used to prepare the ethyl nitrite ; it is here, without doubt,

that most of the difficulty occurs, as the products of the several methods, although seemingly similar when superficially examined, are very dissimilar when closely scrutinized.

These experiments, which extended over a period of five months, were to have been concluded by determinations of vapor density, coefficient of expansion, and specific gravity at the various temperatures, when they were cut short by the approach of warm weather.

ABSTRACTS FROM THE FRENCH JOURNALS.

[Translated for the AMERICAN JOURNAL OF PHARMACY.]

BISULPHIDE OF CARBON FOR PULMONARY AFFECTIONS. Dr. Guerra Estape, (*Revista de Ciencia Med.*; *Nouveaux Remèdes*, Aug. 8, 1887), claims to have cured several cases of chronic bronchitis and one of consumption, with this remedy. Experiments made upon himself seemed to show that the medicament was largely eliminated by the lungs; air from the lungs conveyed by means of a glass tube through Fehling's solution, gave a flocculent precipitate of sulphate of copper. The medicine gave rise to no unpleasant symptoms and was effective when a mixture, as follows, was administered in doses of 15 gm. once daily: Sulphide of carbon, 25 gm.; water, 500 gm.; ess. menth. 30 drops. Patients were forbidden to use alcohol, its being liable, according to the author, to act upon the bisulphide in the blood, thus forming sulphuretted hydrogen.

RESEARCH OF POTASSIC NITRATE IN THE CHLORATE. Jorissen (*Jour. de Phar.*, Antwerp, July; *Arch. de Phar.*, September 5th), gives a short method based on the transformation of nitric into nitrous acid, under the influence of nascent hydrogen; and upon the use of Griess' reagent, the hydrochlorate of metadiamidobenzol, which is now in general use in laboratories for finding nitrous acid. A few grammes of the chlorate to be examined are heated in a test-tube with ten ccm. of distilled water; let stand a while and decant; add three drops acetic acid (concent.), and a fragment of pure distilled zinc; let stand five or ten minutes, remove the zinc and add a few drops of the reagent of Griess. If a nitrate is present in the chlorate, the mixture, on agitation, will turn red. The color grows deeper and deeper, and in the presence of one per cent. of nitrate becomes brown. The test is sensitive to minute quantities.

CANADOL is described by Dr. Pliouchkine (*Bull. Méd.*, Aug. 21), as a hydro-carbon from American naphtha, transparent, very volatile, having an odor of benzin, and as being insoluble in water and alcohol. Using it as a local anæsthetic¹ he obtained the desired effect in one minute; unlike the effect obtained from ether, the sense of coldness lasted for several minutes. He was thus able to use it in enucleations and minor surgical operations. The cost is very moderate.

CANTHARIDES of a worthless nature—the active constituents having been removed by ether—are said by the *Bull. Soc. Phar. Bruxelles*, to be met with in the market. The article looks well and has the characteristic odor, but, pressed between the fingers it lacks substance. An ethereal tincture of good cantharides is of a greenish-yellow color. The extract is thick, of a greenish-yellow color and contains crystals of cantharidin; applied to the skin it produces a blister. Ethereal solutions of the fraudulent article are nearly colorless. The extract is brownish-yellow; there is no trace of crystals in it, and it will not blister.

LANTANINE AS A SUBSTITUTE FOR QUININE. In *Nouveaux Remèdes*, Aug. 24, lantanine is described as an alkaloid of *Lantana brasiliensis*. Like quinine, it is said to act upon the circulation, retard nutrition and lower the temperature. It is supported by the most delicate stomachs. According to M. Buiza (Lima), intermittent fevers, which are rebellious to quinine, give way to the influence of two grammes (*sic*) of lantanine. Its antipyretic powers are obtained by giving one or two grammes in twenty-four hours in pill form, each pill containing ten cgm. In intermittent fevers lantanine should be given immediately after the attack, and in ninety-nine cases out of one hundred, so says the author, it will not return. The medicament is given in pill form on account of its very bitter taste. (See also AMERICAN JOURNAL OF PHARMACY, 1886 p. 611).

PYRIDINE FOR ASTHMA.—Germain Sée, according to *Nouveaux Remèdes*, Aug. 24, recommends that it be inhaled three times a day for twenty minutes, from a warm saucer into which a teaspoonful of the pyridine has been poured. After each sitting the patient should take a tablespoonful of the following: Syr. tolu and syr. papaveris, of each 250 gm.; pot. iodidi, 25 gm.

¹ This is probably identical with *rhigolene* mentioned in this JOURNAL in 1866 p. 363; 1868 pp. 349, 350, and 1885 p. 206.—EDITOR.

THE REACTIONS OF ACETANILID (antifebrin) are given in the *Arch. de Phar.*, Sept. 5. Warm-solutions redden with perchloride of iron, and dilute chromic acid gives a darker shade of the same color. When acetanilid is heated with nitrate of mercury it dissolves; the addition of sulphuric acid gives a bright red. This reaction is common to resorcin, phenol, thymol and salicylic, tannic and gallic acids; benzoic acid is an exception. It may be isolated with ether or chloroform from urine to which it has been previously added. But this reaction does not take place in the urine of patients who are taking the medicament, showing that it had undergone a change before reaching the urinary organs. Such urine should be treated by ether, then by caustic soda; this should be neutralized with sulphuric acid and the ether evaporated. By this means Calm and Hepp claim to have obtained crystals presenting the characteristics of acetanilid. Della Cella also obtained these crystals, but states that they did not give the reactions indicated above.

PTOMAINES.—Following are the principal facts and conclusions developed in the recent researches of Brouardel, Ogier and Minovici, upon the cadaveric alkaloids, and communicated to the Paris Academy of Medicine, June 28, 1887. (See also AMERICAN JOURNAL PHARMACY, May, 1887). The liver and kidneys furnished residua which generally gave the same reactions. The most abundant residua were given by amylic alcohol (alkaline solution), next came benzin and chloroform (acid solution). In a single case (foetal and free from putrefaction), no alkaloidal reaction was presented. In all others, basic substances were obtained capable of precipitation by the general reagents; the most sensitive of the latter was liq. iodinii comp. The residua appeared in notable quantity in viscera newly putrefied (two to four days in summer); they were more abundant in cadavers of eight to twenty days. After two years or over, the amount of ptomaines visibly diminished. An examination of our tables will give an idea of how much confidence should be accorded to the various colored reactions in searching for toxic vegetable bases, and will show the influence of the ptomaines upon these reactions. For example: perchloride of iron gave no coloration; hence it is a good reagent for morphine; alcoholized potassa, after oxidation by nitric acid, gave no violet reaction, comparable with that which atropine would give; nitric acid alone generally produced yellow or orange colorations, much less intense than brucine would have given, but capable, up to a

certain point, of being confounded with the tint which a trace of morphine would have given. The use of reagents containing a large excess of sulphuric acid (molybdate, vanadate, selenite, etc.) is made very uncertain by the presence of ptomaines. We obtained, in fact, colorations of variable tones, reddish, sometimes violet, and oftener identical with those which sulphuric acid alone would have given. With bichromate and sulphuric acid we saw produced on a single occasion only, a violet tint analogous to that which a trace of strychnine would give. With alcoholized sulphuric acid and ferric perchloride, certain residua gave greenish tints, which could be confounded with the coloration given by digitalin in like conditions. It is important therefore, to take account of the various causes of error, but we must not exaggerate their importance. The colorations due to the ptomaines are never in fact so clear and so evident as colorations of the same kind produced by vegetable bases. If we remember that a single color-reaction would not suffice for the official conclusions of the expert, and that he would also have to depend upon the agreement of a group of chemical or physiological signs, we will see that the chances for error are in reality infinitely small. But if it appears to us altogether improbable that the medico-legal expert would confound a ptomaine with a vegetable base, it is also very certain that the presence of the ptomaines would obscure, in a large measure, the clearness of reaction in the toxic alkaloids which might really exist in the extraction made; and consequently that small quantities of these alkaloids might remain unperceived. The complete purification of the residua, the separation of the ptomaines and the vegetable bases is, therefore, for toxicological research, a problem of the highest importance, and one whose solution is yet to be found.—*Archives de Pharmacie*, August 5, 1887.

Lanolin v. lard.—Experiments made with a view of determining the relative value of lanolin in promoting absorption through the skin have been reported upon by Dr. Guttman in the *Med. Chron.*, potassium iodide and salicylic acid being used, as being readily detected in the urine. Ointments of equal strength, made with lanolin and with lard, were used upon four different patients, and, in the subsequent examination of the urine, the most frequent and distinct indications of the absorption of the iodide or of salicylic acid were found after the use of the lard ointment. At any rate, the results are considered to prove, at least, that lanolin possesses no superiority over lard in promoting the absorption of potassium iodide or salicylic acid through the skin.—*Am. Pract. and News*.

REACTIONS OF KAIRINE, ANTIPYRINE AND ANTI-FEBRIN.

Translated from L'Orosi, 1887, pp. 114 and 274, by Jos. W. England, Ph. G.

Kohn, in *Jour. d'Alsace-Lorr.*, gives the following: *Kairine*, with a drop of ferric chloride in a weak aqueous solution, instantly, assumes a violet color that rapidly passes to brown. An excess of ferric chloride to a strong solution of kairine produces an almost black precipitate. Bichromate of potassium, in neutral solution, gives an intense coloration and separates a violet pigment, on standing, which, dissolved in alcohol, forms a black solution.

Antipyrine in weak solution, forms a rose color with ferric chloride that is visible in a 1 to 100,000 solution. With nitrous acid added to a dilute solution, a blue-green color is produced, while in the concentrated solution, green crystals are deposited.

Antifebrin with the reagents previously mentioned undergoes no change, but boiled with potassium hydrate, evidence of the existence of aniline is obtained and, after distillation, potassium acetate may be found in the retort. (See also page 491.)

In the *Apoth. Zeitung* the following test is given for antifebrin: Boil a few centigrams of antifebrin, with one cc. of officinal solution of potassium hydrate and hold suspended in the tube a glass rod, which has been dipped in a solution of chlorinated lime; the drop of solution suspended on the end of the rod will acquire an amber color, which, on continuing the ebullition, passes little by little to violet. This violet coloration results from aniline, which is produced from the antifebrin by the boiling caustic potassa. It may be well to further note that if the test is made directly with aniline, the violet coloration of the drop appears at once, without the primary change to amber color, as in the case of antifebrin.

A formula for ergot, hypodermatically.—Hildebrandt recommends the following:

Aqueous extract of ergot	3 parts.
Glycerin	
Distilled water, each	7 parts.

From five to twenty drops may be injected beneath the integument of the thigh or abdomen to check uterine hemorrhage.—*Journal de Médecine; Med. News*, Aug. 20.

NEW METHOD FOR THE VOLUMETRIC ESTIMATION
OF UREA.

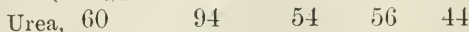
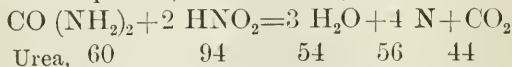
BY DR. G. CAMPARI.

Translated from "*Annali di Chim.*" 1887, page 156, by Jos. W. England, Ph. G.

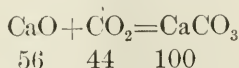
This method is based upon the decomposing action exercised by nitrous acid upon urea to form carbonic anhydride, nitrogen gas and water. In a glass flask of about 200 cc. capacity, place 20 cc. of a 10 percent. solution of nitrite of potassium, then 2 cc. of the urine, or of the liquid containing the urea, and then 2 cc. of a 5 per cent. solution of sulphuric acid (or 1 cc. of the diluted sulphuric acid of the U. S. P., 1880). After the addition of the acid, through the safety tube, conduct the evolved gases through the other tube alongside, descending into a flask containing 110 cc. of lime-water. Warm, very slightly, the urea containing flask, so that the reaction takes at least fifteen minutes time. When the connecting tube becomes warm, from hot aqueous vapor, the operation is at an end and the lime solution should be removed at once.

Now measure 10 cc. of this liquid, turbid with its suspended calcium carbonate and color rose-violet, with a drop of an alcoholic solution of phenol-phthaleine and, first, determine the number of cc. of a solution of oxalic acid, containing 3.15 gm. to the liter, that are needed to neutralize the 10 cc. of the liquid. Then multiply the volume of the oxalic acid solution used by 0.0165 and subtract the product from the number 0.15; the difference indicates the amount of urea contained in the 2 cc. of urine, or the urea containing liquid examined.

Pavesi and Rotondi have found that 1 cc. of lime-water is neutralized by 0.00241 gm. of tartaric acid; therefore every cc. contains 0.001273 gm. of CaO, and 110 cc. of lime-water should then contain 0.14003 of CaO; corresponding to 0.15 gm. of urea. The chemical reactions of this new process, are as follows, first:



Secondly:



Now since 44 gm. of CO₂ are equivalent to, or neutralize, 56 gm. CaO, then 56 gm. of CaO are equivalent to 60 gm. of CO (NH₂)₂, for 60 gm. of CO(NH₂)₂ yield 44 gm. of CO₂ (as seen in the first

equation); and if 56 gm. of CaO equal or represent 60 gm. of CO (NH₂)₂, then 0.14003 gm. of CaO (the amount contained in the 110 cc. of lime-water employed) equals 0.15 gm. of urea, thus:

$$56 : 60 :: 0.14003 : 0.15.$$

Then if you employ 110 cc. of lime-water and if, after the operation, you subtract from the number 0.15, the quantity of urea corresponding to the lime not precipitated by CO₂ in the 110 cc. of lime-water, you will have the quantity of urea corresponding to the lime precipitated. In order to know the quantity of urea corresponding to the CaO not precipitated (which remains in solution), take from the product, that one molecule of oxalic acid neutralizes, one molecule of CaO, and this corresponds analytically, to one molecule of urea. Then, if 1000 cc. of the above oxalic acid solution corresponds to 1.5 gm. of urea, 1 cc. corresponds to 0.0015 gm. of urea. Therefore multiply the number of the cc. of the solution of oxalic acid used (to neutralize the 10 cc.) by 0.0015, which equals, equivalently, the quantity of urea in 1 cc., or, which is the same thing, multiply that number by 0.0165 for 11 times the proportion) this will give the urea corresponding to the lime left in solution), and subtract this quantity of urea from 0.15 (urea corresponding to the lime contained in 110 cc. of lime-water); the difference represents the urea corresponding to the lime precipitated and contained in the liquid analyzed.

Dr. Campari gives the results of a number of determinations, first, upon a solution of urea, 25 to 1000, and then upon urine, in comparison with the well-known process of Liebig; the latter results are as follows:

Urine used.	Oxalic Acid used for 10cc. of Lime-Water.	Urea in 1 Liter, (Campari.)	Urea in 1 Liter, (Liebig.)
2 cc.	6.6 cc.	20.55 gm.	20.20 gm.
2 cc.	6.3 cc.	23.05 gm.	22.90 gm.
2 cc.	6.45 cc.	21.80 gm.	21.55 gm.
2 cc.	6.95 cc.	17.70 gm.	17.35 gm.

These results, according to the author, demonstrate that this nitrous acid method conduces to the best results obtainable. But in order to secure absolutely accurate results, it is necessary that the heating of the flask be slow, in order to avoid, especially, the raising of the vapor of nitric acid that could be formed, by the decomposition with the sulphuric acid, from the potassium nitrate, always present in the commercial nitrite.

In the rule previously given, there are directed 110 cc. of lime-water rather than 100, in order to facilitate analytical calculations. 110 cc. of lime-water contains 0.14003 gm. of CaO, that corresponds to 0.15 of urea; this number is easy to remember, while the same can not be said for the number 0.1363 (urea) corresponding to the lime (0.1272) contained in 100 cc. of lime-water.

In conclusion, the subjoined equivalent table is given, in which is stated the quantity of urea contained in a liter of any possible sample to be examined, indicated by the number of cubic centimeters of the oxalic acid solution used to neutralize 10 cc. of the lime-water.

Oxalic Acid used, (cc.)	Urea, (per liter.)	Oxalic Acid used, (cc.)	Urea, (per liter.)	Oxalic Acid used, (cc.)	Urea, (per liter.)	Oxalic Acid used, (cc.)	Urea, (per liter.)	Oxalic Acid used, (cc.)	Urea, (per liter.)
4.0	42.00	5.0	33.75	6.0	25.50	7.0	17.25	8.0	9.00
4.1	41.20	5.1	32.95	6.1	24.70	7.1	16.45	8.1	8.20
4.2	40.35	5.2	32.10	6.2	23.85	7.2	15.60	8.2	7.35
4.3	39.55	5.3	31.30	6.3	23.05	7.3	14.80	8.3	6.55
4.4	38.70	5.4	30.45	6.4	22.20	7.4	13.95	8.4	5.70
4.5	37.90	5.5	29.65	6.5	21.40	7.5	13.15	8.5	4.90
4.6	37.05	5.6	28.80	6.6	20.55	7.6	12.30	8.6	4.05
4.7	36.25	5.7	28.00	6.7	19.75	7.7	11.50	8.7	3.25
4.8	35.40	5.8	27.15	6.8	18.90	7.8	10.65	8.8	2.40
4.9	34.60	5.9	26.35	6.9	18.10	7.9	9.85		

THE FORMS OF ALBUMEN IN THE URINE, AND THEIR TESTS.¹

By DR. T. GRAINGER STEWART, Physician in Ordinary to the Queen for Scotland.

The forms of albumen met with in the urine are :—

I. *Serum Albumen*, a substance which, according to Hammarsten, constitutes 4.516 per cent. of the blood serum. It is almost constantly present in urine which contains any variety of albumen. Although a less diffusible body than serum globulin, it is capable of passing through membrane.

II. *Serum Globulin or Paraglobulin*, the globulin of the blood serum, of which it constitutes 3.103 per cent. It is met with in almost all albuminous urines, its proportion to the serum albumen varying in different instances.

¹ From a lecture delivered at the University of Edinburgh; reprinted from *Quart. Compend. of Medical Science*.

III. *Peptone*, a product of gastric and pancreatic digestion of albuminous substances, also occurring in the process of transformation of tissues and of inflammatory effusions. It is a readily diffusible substance, occasionally met with in the urine in association with or apart from serum albumen.

IV. *Propeptone*, or *Parapeptone*, or *Hemialbumose*, a substance or group of substances intermediate between albumen and peptone, constituting a stage or stages of transformation from the one to the other. It is highly diffusible, and is occasionally met with in the urine under conditions corresponding to those under which peptone occurs. This is the peculiar form of albumen which was discovered in the urine by Dr. Bence Jones, in a case of osteomalacia.

V. *Acid Albumen*, or *Syntonin*, one of the derived proteids obtained by the action of acids upon albumen. It is easily produced artificially by the addition of acid to albuminous urine, but may occur naturally in certain cases.

VI. *Alkali Albumen*, another derived proteid, produced by the action of alkalis upon albumen. It is readily produced artificially, but is also found naturally in the urine.

VII. *Hæmoglobin*, the combination of hæmatin and globulin naturally existing in the red corpuscles of the blood. It sometimes appears in the urine, particularly in cases of hæmaturia and hæmoglobinuria, also in certain septic conditions, and after inhalation of arseniuretted hydrogen, transfusion of blood, and otherwise.

VIII. *Fibrin*, a proteid substance which does not normally exist as such in the blood. It is met with in the urine in hæmaturia, in some cases of chyluria, and in certain varieties of renal casts.

IX. *Mucin*, the chief constituent of mucus, is a derived proteid substance. It frequently becomes superadded to the urine after secretion, and may be derived from any part of the urinary tract.

X. *Lardacein*, *Waxy* or *Amyloid Material*, familiarly known as a pathological substance within the body, is said to be occasionally demonstrable in renal casts.

Of these ten varieties the last four are of little practical importance—mucin alone being indeed worthy of special comment, and that mainly because of the difficulties which its presence raises in regard to the reliability of certain tests for serum albumen.

As to the tests for the albumens, he puts in tabular form the

chief tests for the different varieties of albumen, with their actions upon each variety.

TABLE 1.—SHOWING TESTS FOR THE CHIEF FORMS OF ALBUMEN.

	SERUM ALBUMEN.	SERUM GLOBULIN.	PEPTONES.	PROPEPTONES.	ACID AL- BUMEN.	ALKALI ALBUMEN
Heat.	Opacity.	Opacity.	0	0	0	0
Heat with nitric acid.						{ Opacity.
Heat with acetic acid.						
Cold, nitric acid.	Opacity.	Opacity.	0	Opacity dissolved by heat.	Opacity.	Opacity.
Metaphosphoric acid.	Opacity.	Opacity.	Opacity diminished or dissolved by heat.	Opacity diminished or dissolved by heat.	0	Opacity.
Acidulated brine.	Opacity.	Opacity.	Opacity diminished or dissolved by heat.	Opacity diminished or dissolved by heat.	Opacity.	Opacity.
Picric acid.	Opacity.	Opacity.	Opacity dissolved by heat.	Opacity dissolved by heat.	Opacity.	Opacity.
Potassio-mercuric iodide.	Opacity.	Opacity.	Opacity dissolved by heat.	Opacity dissolved by heat.	Opacity.	Opacity.
Potassium ferrocyanide.	Opacity.	Opacity.	0	Opacity dissolved by heat.	Opacity.	Opacity.
Dilution with water.	0	Slight opacity.	0	0	0	0
Magnesium sulph.	0	Opacity.	0	0	Opacity.	Opacity.
Fehling's solution.	Brownish-red or mauve.	--	Rose pink or purple.	Rose pink or purple.		
Randolph's test.	--	--	Yellow opacity.	Yellow opacity.		

The oldest test for albumen depends upon *its coagulability by heat*. Heat coagulates the serum albumen (opalescence occurring at 60° C., coagulation at 72° to 75°), and also the serum globulin (opalescence occurring at 68° C., coagulation at 75°); has no effect upon the peptones, propeptones, nor upon acid or alkali albumen, unless an alkali or acid has first been added. It, however, produces cloudiness with phosphates, by driving off carbonic acid, which holds them in solution, and the further addition of nitric acid, by redissolving them, clears up the opacity. A preliminary acidulation with acetic or nitric acid prevents this cloudiness, but may convert albumen into acid albumen, and so make the test fail, but on the whole, if cautiously employed, heat will be found a good test. A further security may be obtained by using both acetic acid and a concentrated solution of magnesium sulphate, or of sodic sulphate or of common salt, for these prevent the undue action of the acid upon the albumen.

The *Cold Nitric Acid Test* ranks next in date of introduction and in general popularity to that by heat. When a layer of nitric acid is

brought into contact with a layer of urine, a white coagulum is formed at the line of junction of the fluids. The acid coagulates serum albumen, serum globulin, has no effect upon peptones; gives an opacity with propeptones, which, however, disappears with heat; has no effect upon acid albumen, but gives distinct reaction with alkali albumen. One or two sources of fallacy must be kept in view when one employs this test. It may give a precipitate with urates, with urea, or with resinous substances. Such fallacies may be avoided by the adoption of very simple precautions, which are fully detailed in the books on urinary analysis.

Metaphosphoric Acid is an excellent test for albumen, but as it is only serviceable when pure, and difficult to keep in that condition, it has not come into general use.

Acidulated Brine is also a test of considerable value, acting upon all varieties of albumen, but it is not likely to become greatly trusted, because of its frequently giving some reactions with normal urine.

Picric Acid is a test which has been brought into use in Great Britain mainly by the recommendation of Dr. George Johnson. It produces an opacity with all the forms of albumen; but while those with serum albumen, serum globulin, acid and alkali albumen persist or become more distinct with heat, those with peptone or propeptone dissolve. It must be remembered, also, that alkaloids, such as quinine, give a cloud with this reagent, but one which rapidly disappears with heating. On the whole, I believe this to be the most reliable and delicate test which we at present possess.

It has been objected to the test, that it precipitates mucin as well as serum albumen, and that this is a source of fallacy, particularly when it is used by the contact method. Careful investigations by Professor Stewart, showed that while a large number of the specimens gave distinct reactions both with picric and citric acids, there were three which gave an opalescence with picric and not with citric, and seven of those which reacted with citric acid gave no reaction with picric. From these facts he concludes that mucin may be demonstrated by citric acid when no reaction is produced with picric, and that picric may show minute quantities of albumen in urines in which citric acid fails to show mucin.

On the other hand, picric acid often produces an opalescence in urine apparently free from albumen, and Dr. Stevens made a series of careful experiments which seem to indicate that picric acid acts upon

mucin, although more slowly and less distinctly than does citric acid. The degree of acidity of the urine is probably an important element in relation to this reaction with picric acid; and Professor Stewart thinks that where acid is present in quantity the opalescence is distinct; where it is in slight amount, it is comparatively or completely absent.

It is likely that although picric acid often affects mucin, it does not do so in such a way as to render it unreliable as a delicate test for albumen. Its precipitate with mucin is, even when applied by the contact method, a slight, slowly developed haze. A precipitate indicating albumen is more marked and more quickly produced. A little practice in the use of the test will soon render any one familiar with the degree and rate of formation of the opacity which indicates albumen as distinguished from those which mark the presence of mucin.

Potassio-mercuric-iodide, which was first proposed as a test by M. Tanret, corresponds in its action to picric acid, giving opacity with serum albumen, globulin, acid and alkali albumen, and an opacity dissolved by heat with peptone and propeptone. But it will be found to give a reaction with a very large proportion of normal urines, and as the addition of an organic acid—citric or acetic—is required to bring out the reaction, it is clear that mucin must, in many cases, give a degree of opalescence. It may be that other sources of fallacy exist in regard to slighter reactions. Dr. Oliver's method of applying this test greatly reduces the chances of error, but its disadvantages render it an inferior test to the picric acid.

Potassium Ferrocyanide, first suggested by Dr. Pavy, also resembles picric acid in its action, except it does not give any indication with peptones. The objections which induced Professor Stewart to reject the reagent last described apply to this one also.

Dilution with water is a convenient but not very reliable test of the presence of serum globulin, as it produces a milkiness, that substance being soluble in weak saline solutions, but not in pure water or extremely diluted solutions of salts. It produces no effect upon other forms of albumen.

Magnesium Sulphate is a valuable test for serum globulin, as it produces a milky opacity with that substance, which speedily deposits as a precipitate. It has no action upon serum albumen, peptone or propeptone, but produces an opacity with acid and alkali albumen. It is best used in saturated solution by the contact method. By its use

also, according to methods described in works dealing with the subject of physiological chemistry, the globulin may be separated nearly pure, and its amount determined.

Fehling's Solution, or other alkaline solution of copper, is a most convenient test for peptone and propeptone, giving with these a rose-pink or purple color at the point of contact of the test with the supernatant urine and producing no effect upon the others, with the exception of serum albumen, with which it gives a brownish-red hue.

Randolph's Test for peptone and propeptone, which consists in the addition of one drop of saturated solution of iodide of potassium and then of two drops of Millon's reagent (an acid solution of nitrate of mercury) to a drachm of urine, gives a yellow, instead of a red precipitate when these substances are present; but as Randolph has pointed out, it gives the same color reaction with bile salts, which are frequently present in considerable amount in the urine. Therefore we cannot esteem it so highly as the copper and alkali test.

The presence of hæmoglobin may be made out by the guaiac reaction or by the spectroscope; the presence of fibrin may be ascertained by its decomposing with effervescence hydrogen peroxide; mucin may be discovered by means of citric or acetic acid; and waxy material may be shown (if it is ever present) by iodine, and sulphuric acid, or by methylaniline violet.

Table II will show the results of tests as to the relative delicacy of the principal tests for albumen. The first column shows the dilution up to which the action of each reagent remained distinct; the second shows the percentage of albumen, as calculated from the total quantity in the undiluted fluid and the number of dilutions; and the third shows the grains, or parts of a grain, per ounce, as calculated from the same data:

TABLE II.—Showing the Comparative Delicacy of Tests for Serum Albumen.

TESTS.	DILU- TIONS.	PER- CENTAGE.	GRAINS PER OUNCE.
Boiling.....	300	0.0005	0.00218
Acidulation with acetic acid, and boiling.....	500	0.0003	0.001311
Cold nitric acid.....	50	0.003	0.01311
Metaphosphoric acid.....	500	0.0003	0.001311
Picric acid.....	1000	0.00015	0.000655
Potassio-mercuric-iodide. (Test papers).....	500	0.0003	0.001311
Ferrocyanide of potassium.....	500	0.0003	0.001311

The urine contained albumen to the amount of 1.5 grammes per liter, which is equal to 0.15 per cent., or 0.655 of a grain per ounce.

The results show that the *boiling test*, carefully applied, is an excellent one, revealing the presence of so little as 0.00218 of a grain per ounce, and continuing to show up to the 300th dilution of the standard specimen. But heat, with preliminary acidification with a little acetic acid, was still more delicate, showing 0.001311 of a grain per ounce, and giving a perceptible haziness up to 500 dilutions.

The Cold Nitric Acid Test falls far short of this in delicacy, for it does not give a distinct reaction beyond the 50th dilution, and therefore shows only with 0.01311 of a grain per ounce. It is true that if the specimen is allowed to stand, the reaction may gradually manifest itself, with minute traces of albumen; but this is inconvenient, and for practical use tests are to be estimated in proportion to their rapidity of action.

Metaphosphoric Acid gave the same results as heating after acidulation with acetic acid, *viz.*, showing till the 500th dilution of the standard urine, and 0.001311 of a grain per ounce.

Picric Acid proved the most delicate test, giving a faint but perceptible reaction up to the 1000th dilution of the standard specimen, which is equal to 0.00015 per cent., or 0.000655 of a grain per ounce.

The *Potassio-mercuric Iodide* and the *Ferrocyanide of Potassium* Tests gave the same results as metaphosphoric acid, showing albumen up to the 500th dilution of the standard specimen, equal to 0.001311 of a grain per ounce.

From these and other observations Prof. Stewart concludes that picric acid is the most delicate of all the reagents which we possess for albumen, and that next to it rank the potassio-mercuric iodide, the heating after acidulation with acetic acid, the ferrocyanide of potassium, and the metaphosphoric acid. Boiling and adding nitric acid is less delicate, and still less so is the cold nitric acid test.

But delicacy is not the only quality required of a test. Indeed, a test may be too delicate for practical purposes. And again tests otherwise suitable may be practically inconvenient. Nitric acid is difficult to carry about, and picric acid presents a similar disadvantage, although in a minor degree. The test pellets devised by Dr. Pavy, of London, and the test papers of Dr. Oliver of Harrowgate, are extremely convenient, being easily carried about, and very delicate. But it may be held that they are too delicate, for few urines fail to show

some reaction with them. Indeed, many of them show some reaction with practically normal urines. The smallest quantity of mucin may suffice to produce the reaction, or a quite infinitesimal trace of albumen proper. The tests must be used with discrimination, and too much importance must not be attached to their fainter indications. Albuminuria is rarely a serious condition unless it is sufficiently pronounced to be made out by the cold nitric acid test.

As to the quantitative analysis of albuminous urine, Prof. Stewart approves most highly of the coagulating, drying and weighing process. A less laborious process is that known as Esbach's method. This plan requires certain special tubes, graduated so as to show the height to which the urine to be tested, and that to which the reagent (a solution of picric and citric acids) should reach, also the number or proportion of grammes per liter. The urine is filled up to the level indicated by the letter U, then the test fluid to the line marked R, and the fluids having been thoroughly mixed, are set aside to stand for twenty-four hours. At the end of that time the level reached by the coagulum, enables us to read off the grammes per liter. The observations brought out a result, as is seen in the table, of 2.5 grammes per liter, which is equivalent to 0.25 per cent., or 1.0837 grains per ounce. It thus very closely corresponded to the results obtained by the first method.

Esbach's method brings out results closely corresponding to those obtained by the elaborate drying and weighing process. As the method is easily worked, as well as so reliable, it is a good one to adopt. Its only disadvantages are that one must wait twenty-four hours before the result can be obtained, and that it does not enable us to measure less than 0.5 grammes per liter.

PROTEIDS OF SEEDS OF ABRUS PRECATORIUS.¹

By SIDNEY MARTIN, M.D., London.

The proteids of the seeds of abrus, the Indian licorice, are important physiologically, because they have been shown by Warden and Waddell² to be possessed of poisonous properties. To the poisonous

¹ From the "Proceedings of the Royal Society;" reprinted from *Phar. Jour. and Trans.*, Sept. 17th, p. 234.

² "The Non-bacillar Nature of Abrus Poison." By C. J. H. Warden and L. A. Waddell. Calcutta, 1884.

product extracted by these observers the name "abrin" was given; and though it was decided that abrin was closely allied to "plant-albumin," yet no experiments were recorded to show whether the product was a mixture or a single proteid. They obtained it by making a watery extract of the crushed seeds and precipitating with alcohol, the precipitate being afterwards collected and dried.

Before proceeding to an examination of the physiological action of the jequirity, it seemed to me desirable to determine the kind of proteids present in the seeds, and the present communication embodies the results of the inquiries made with a view to such determination.

Method of extraction of the proteids.—The method used was based on the supposition that the proteids present in abrus were similar to those in other seeds, consisting chiefly of proteids of the globulin and albumose classes.

The finely ground seeds were shaken first of all with chloroform to remove the red cuticle which sinks in this liquid, so that the yellow kernel-powder could be readily removed, and obtained in the dry state by allowing the chloroform to evaporate.

The powder obtained was then extracted with 15 per cent. sodium chloride solution for twenty-four hours, and the mixture filtered. The yellowish filtrate was distinctly acid and gave a copious precipitate onboiling. The proteids were separated from this filtrate in two ways:—

1. Saturation with neutral ammonium sulphate and shaking for four hours throws down all the proteids in solution; the filtrate, after saturation, giving none of the proteid tests.

2. Saturation with sodium chloride and shaking for many hours gives only a scanty precipitate, which becomes copious on adding a large excess of glacial acetic acid. All the proteids are only with difficulty precipitated by this mode of saturation, even after prolonged shaking.

Since ammonium sulphate so readily throws down all the proteids in solution, the precipitate caused by it was used in the following manner in the examination of the proteids: The precipitate was collected and dissolved by adding distilled water, and the solution dialyzed in running water (with thymol) for five to seven days.

Dialysis caused a copious precipitate, which was collected and washed with distilled water (previously boiled to remove carbon dioxide) until no proteid in solution was present in the washings. The precipitate

was then dried over sulphuric acid. The residue was in dark brown scales. It consisted of globulin with some coloring matter.

It is not possible to remove all the globulin by dialysis, so the liquid, after dialyzing for seven days, was filtered into rectified spirit, which precipitated the remaining proteids. After standing under the alcohol six to eight weeks the globulin was coagulated, and the precipitate was collected, dried, and treated with distilled water, which dissolved out a proteid. This proteid is an albumose. The chloride of sodium method may be used instead of the ammonium sulphate; it takes a longer time, but gives products freer from coloring matter.

For chemical examination, the albumose is readily prepared by boiling and filtering an aqueous infusion of the seed. The globulin is coagulated while the albumose remains in solution.

Properties of the globulin.—1. It is insoluble in distilled water, but readily soluble in 10 to 15 per cent. sodium chloride or magnesium sulphate solution; soluble to a less extent in 5 per cent. sodium chloride solution, and scarcely at all in 0.75 per cent.

2. It is completely precipitated from solution by saturation with sodium chloride after slightly acidifying, and with ammonium sulphate, whether the solution be neutral, acid, or alkaline.

3. It is coagulated by heat in 10 per cent. magnesium sulphate solution, between 75° and 80° C., the liquid being made distinctly acid; in 10 per cent. sodium chloride, between 66° and 73° C.

4. When the solution in 10 per cent. sodium chloride is placed in the incubator at 35° to 40° C., and allowed to remain twenty-four or even forty-eight hours, no precipitation occurs; a reaction in marked contrast to that given by some vegetable globulins. In its high coagulation temperature, and in its non-precipitation from solution by prolonged exposure to a moderate heat, abrus-globulin agrees with the proteid I have described in the juice of the fruit of *Carica papaya*, which, from its resemblance to serum-globulin, I have called vegetable paraglobulin.¹ The vegetable myosins occurring in the cereals, wheat, rye and barley, have a lower coagulation temperature than the paraglobulins, viz., 50°–55° C., and are precipitated from solution and rendered insoluble by a prolonged exposure to a temperature of 35°–40° C.²

Properties of the albumose.—1. Soluble in cold or boiling distilled

¹ "Nature of Papain, etc.," *Jour. of Physiol.*, vol. vi., p. 353.

² "Physiol. Soc. Proc.," February 12, 1887.

water. Its chemical and physical properties are not apparently altered by boiling its solution.

2. It is not precipitated from solution by saturation with sodium chloride unless a large excess of glacial acetic or phosphoric acid be added. It is readily precipitated by saturation with neutral ammonium sulphate.

3. It does not form an albuminate.

4. Nitric acid does not precipitate it in a watery solution; but a precipitate falls if solid sodium chloride be added nearly to saturation.

5. Acetic acid causes a cloudiness, which is increased by potassium ferrocyanide.

6. Copper sulphate and basic acetate of lead cause precipitates, soluble in excess; mercuric chloride, a precipitate insoluble in excess.

7. Copper sulphate and potash give a pink coloration (biuret reaction).

For the albumoses occurring in the vegetable kingdom I have proposed the name *phytalbumoses*, as they differ in many respects from the animal varieties.

The phytalbumose in *abrus* is closely allied to Kühne and Chittenden's deutero-albumose,¹ and identical with the α -phytalbumose occurring in the papaw juice.²

There are, therefore, two proteids in the seeds of *abrus precatorius*, a vegetable paraglobulin and α -phytalbumose. In conjunction with Dr. Wolfenden, I am now engaged in investigating the physiological action of each of these proteids, and hope soon to publish the results. For the present it will be sufficient to call to notice the close resemblance between the proteids of the papaw juice and those of jequirity, since their physiological action appears to be in many respects similar.

Borate of ammonium.—Lashkevich (cited in *The Lancet*) has found this salt of great value in phthisis. He gives five grains three times a day, in solution, alone or with codeine, hyoscyamus, or some other sedative. The effect is to reduce the expectoration and, in some cases in the early stage, to diminish the fever. Inhalation of a spray of the solution also reduces the expectoration and alleviates irritating and painful conditions of the mouth and throat.—*N. Y. Med. Jour.*, Aug. 27.

¹ Kühne and Chittenden, "Ueber Albumosen," *Zeitschr. für Biologie*, vol. xx.

² "Nature of Papaïn, etc.," *Jour. of Physiol.*, vol. vi., p. 344.

SCHWEIZER'S REAGENT AND "EAU CELESTE."¹

BY H. BAUBIGNY.

"Eau celeste" is obtained by dissolving copper salts in ammonia, and contains salts of the type $\text{CuSO}_4, 4\text{NH}_3 + \text{H}_2\text{O}$. Schweizer's reagent is prepared by treating cupric hydroxide with ammonia, and contains the base $\text{CuO}, 4\text{NH}_3 + 4\text{H}_2\text{O}$, isolated by Malaguti and Sarzeau. Both solutions deposit cupric hydroxide when largely diluted. "Eau celeste," contains salts of the base which exists in the free state in Schweizer's reagent. It follows that solutions of basic cupric salts should behave as mixtures of "eau celeste" and Schweizer's reagent, and this is found to be the case. Such solutions dissolve cellulose more readily the more basic the salt. Conversely, the addition of an ammonium salt to Schweizer's reagent partially converts it into "eau celeste," and if the former has previously been saturated with cellulose, the cellulose is precipitated as the ammonium salt is added. This change is produced by ammonium carbonate and by carbonic anhydride, and it follows, therefore, that when Schweizer's reagent is exposed to the air it will form cuprammonium carbonate, and will eventually be converted into "eau celeste."

The old method of preparing Schweizer's reagent by dissolving copper in ammonia in presence of air, is defective, since it does not avoid the presence of carbonic anhydride, and hence gives a product with diminished solvent powers. Potassium sulphate and sodium chloride are not decomposed by ammonia nor by the cuprammonium base, and therefore they do not affect the properties of Schweizer's reagent. The addition of potassium or sodium hydroxide to "eau celeste" produces a liquid which is capable of dissolving cellulose.

The best method of preparing Schweizer's reagent is to precipitate a solution of copper sulphate with the calculated quantity of soda and dissolve the hydroxide in ammonia.

There can be little doubt that the Schweizer's reagent distributed over vines, as a preventative of mildew, will be rapidly transformed into "eau celeste," which is the actual preservative. The more easily prepared "eau celeste" can, therefore, be used for this purpose instead of the Schweizer's reagent.

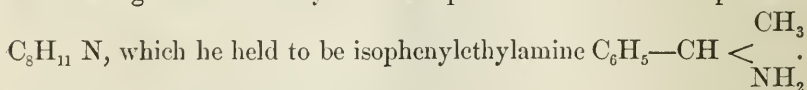
¹ *Compt. rend. civ.*, 1616-1618.—Reprinted from *Jour. Chem. Soc.*, Sept. 1887.

"CHOLERA-RED AND PTOMAÏNES FROM GELATIN."¹

BY DR. BRIEGER.

Pohl discovered, in 1886, that when sulphuric acid is added to cultures of the comma-bacillus a red color is produced; a fact which may be utilized in identifying the bacillus. The coloring matter is named cholera-red, and the present communication deals with the origin of this material; the investigation being possible only after a considerable amount of the coloring matter had been obtained. The cholera-red, which may be obtained pure by recrystallization from benzol, is soluble also in ether, amyl alcohol, and chloroform. Extremely characteristic for cholera-red is its conversion into a blue coloring matter in presence of a certain definite amount of alkali, a shade of color which passes again directly into burgundy red, on the addition of a mineral acid. The blue coloring matter is readily dissolved in amyl alcohol, but on standing, changes to the original color. When the chemically pure cholera-red is distilled in a tube along with zinc dust, a white crystalline substance is sublimated over on to a part of the tube kept cold. This substance has precisely the odor of indol, and, dissolved in water, gives the characteristic red color of indol. It follows that cholera-red is a derivative of indol. Moreover cholera cultures on albuminous soils contain indol, as may be ascertained in the following manner: when these cultures are distilled over with acetic acid, and the distillate treated with fuming sulphuric acid, the nitrous indol color mentioned above as characteristic, is struck. Which derivative of indol cholera-red is will be determined when material has accumulated.

The second part of the paper concerns itself with ptomaines produced in gelatin by the action of bacteria. Nencki in 1876 distilled over some gelatin which had been putrified by contact with the pancreas of an ox, and obtained from the distillate by means of baryta water along with trimethylamine a ptomaine of the composition



The author has obtained from putrefactive mucus neuridine $\text{C}_5\text{H}_{14}\text{N}_2$, dimethylamine $\text{NH}(\text{CH}_3)_2$ and in a very slight amount a poisonous ptomaine whose action resembled that of muscarine. He has also

¹ *Deutsche medicinische Wochenschrift*, June 2, 1887; abstract by Jas. Niven, in *Med. Chronicle*, September.

studied the effect of human excrement on gelatin; 250 grams of gelatin mixed with a minimal quantity of excrement was examined after fifty days' standing in a moderately warm place. After evaporation to dryness with hydrochloric acid, and repeated extraction with absolute alcohol, the extract was precipitated with alcoholic solution of mercury perchloride. The precipitate boiled with water and so dissolved, was treated with sulphuretted hydrogen, filtered off from the compound of mercury and sulphur, and evaporated to dryness. The residue taken up with absolute alcohol left a substance which proved by its reactions to be identical with putrescine hydrochlorate $C_4H_{12}N_2 \cdot 2HCl$. Converted into the gold double salt it yielded the amount of gold corresponding to the putrescine-gold compound. From the alcoholic filtrate evaporated to dryness and treated with platinum perchloride there separated a crystalline platinum double salt in concentrically arranged needles. This is pretty soluble in water, and is of a straw-yellow color. It contains 37.05 per cent. Pt. The hydrochlorate obtained from the platinum salt proved itself by its reactions to be hydrochlorate of propylamine. From the same gelatin was also obtained in large amount a ptomaine which as a platinum double salt crystallized in beautiful gold-yellow scales, and proved to be identical with gadinine previously obtained by the author from putrefying fish. The rest of the paper is occupied with the properties of this ptomaine, which appears in animals to possess a not high degree of toxicity, though man is much more susceptible to it.

STRYCHNINE AND BRUCINE FERRO- AND FERRI-CYANIDES.¹

BY HOLST and BECKURTS.

Normal Strychnine ferrocyanide, $(C_{21}H_{22}N_2O_2)_4, H_4Fe(CN)_6 + 4H_2O$, is precipitated from neutral solutions of strychnine salts by potassium ferrocyanide, forming a white, crystalline powder with a shade of yellow, slightly soluble in cold water, more easily in hot, from which well-formed prismatic crystals separate on cooling. *Acid strychnine ferrocyanide*, $(C_{21}H_{22}N_2O_2)_3, H_4Fe(CN)_6$, is precipitated from a strong hydrochloric acid solution of a salt by potassium ferrocyanide as a white powder with a shade of blue. It is insoluble in cold water and

¹Arch. Pharm. [3], xxv, 313-315.—Reprinted from *Jour. Chem. Soc.*, Sept., 1887.

alcohol, but dissolves in hot water with formation of hydrogen ferrocyanide, giving rise to a blue coloration and the formation of hydrocyanic acid. The salt has a strong acid reaction, decomposes carbonates and is decomposed by ammonia and alkalis with separation of strychnine. *Normal brucine ferrocyanide*, $(C_{23}H_{26}N_2O_4)_4, H_4Fe(CN)_6 + 4H_2O$, is obtained by adding to a concentrated neutral brucine hydrochloride solution, a concentrated solution of potassium ferrocyanide, as tufts of yellow, prismatic crystals; it gives yellow solutions with water and alcohol. In the air it gradually passes into brucine ferricyanide with the separation of brucine. *Acid brucine ferrocyanide*, $(C_{23}H_{26}N_2O_4)_4, H_4Fe(CN)_6$, the salt precipitated from a very concentrated strongly acid solution of brucine by potassium ferrocyanide, forms a white, crystalline powder, as seen under the microscope, which in the air quickly becomes blue. In less concentrated solutions there is no change at first, but after twelve to twenty-four hours beautiful, large, white prisms form of the same composition as the powder. The salt decomposes when heated with water with separation of hydrocyanic acid.

Potassium ferricyanide gives only normal salts. *Strychnine ferricyanide*, $(C_{21}H_{22}N_2O_2)_6, H_6Fe_2(CN)_{12} + 12H_2O$, precipitated from neutral and acid solutions, forms golden-yellow, flat prisms, somewhat sparingly soluble in water to a yellow liquid. *Brucine ferricyanide*, $(C_{22}H_{26}N_2O_4)_6, H_6Fe_2(CN)_{12} + 12H_2O$, is precipitated from acid or neutral solutions of brucine salts as greenish-yellow spangles, sparingly soluble in water to a yellow liquid. Other alkaloids are now undergoing investigation by the authors.

Estimation of strychnine and brucine.—The authors have based a volumetric method on Dunstan and Short's observation that strychnine is completely precipitated from aqueous solution of its sulphate, whilst brucine is not. If a 0.5 to 1 per cent. solution of the two alkaloids, strongly acidified with hydrochloric acid, is treated with potassium ferrocyanide until a filtered portion of the solution gives a blue stain with ferric chloride paper, the whole of the strychnine is precipitated as acid strychnine ferrocyanide, whilst the brucine remains in solution. The amount of strychnine can thus be determined by using a standard solution of ferrocyanide, two hundred and forty-four parts potassium ferrocyanide corresponding to three hundred and thirty-four parts of strychnine. If the solution contain less than 0.5 per cent. the separation is too slow; also the ferric chloride paper should not

be allowed to get perfectly dry before use. A mixture containing 0.145 gram of strychnine and 0.036 gram brucine gave 0.148 gram of strychnine. To estimate the alkaloids when occurring together in, say, tinctura strychni, the total weight of the two is ascertained, then, according to Schweissinger, an excess of centinormal hydrochloric acid is added and the excess determined by centinormal soda solution. The neutral solution thus obtained is concentrated sufficiently and titrated with standard potassium ferrocyanide. A mixture containing 0.1 gram strychnine and 0.5 gram brucine gave 0.1017 of the former and 0.04915 of the latter.

SEPARATION OF THE OPIUM ALKALOIDS.¹

By P. C. PLUGGE.

The six alkaloids narcotine, papaverine, narceine, thebaine, codeine, and morphine are separated by the use of the following precipitants: sodium acetate, potassium ferricyanide, sodium salicylate, potassium thiocyanate, and ammonia. The alkaloids are obtained as an aqueous solution of the hydrochlorides. The liquid is mixed with a sufficient quantity of concentrated sodium acetate solution, allowed to remain twenty-four hours, and filtered. The precipitate, washed with a little water, consists of pure narcotine and papaverine; it is dissolved in dilute hydrochloric acid and diluted until the solution contains not more than $\frac{1}{400}$ of narcotine, when a solution of potassium ferricyanide is added. After remaining twenty-four hours, filtering and washing with a little water, the precipitate of papaverine ferricyanide is obtained from which the alkaloid may be separated by digesting with aqueous soda, filtering, and if necessary dissolving and reprecipitating with ammonia. The filtrate containing the narcotine yields this alkaloid by precipitation with ammonia. The filtrate containing the remaining four alkaloids, together with an excess of sodium acetate, is concentrated to a small volume on the water-bath and allowed to remain twenty-four hours, then filtered. The precipitate washed with a little water, consists of narceine separated directly from the liquid as pure alkaloid. The filtrate contains traces of narceine and all the thebaine, codeine, and morphine. It is mixed with a sufficient quantity of sodium salicylate solution. After twenty-four hours the

¹Arch. Phar. [3], xxv, 343-354.—Reprinted from *Jour. Chem. Soc.*, Sept., 1887.

crystalline precipitate is filtered and washed with a little water. It consists of thebaine salicylate. On washing this on the filter with dilute ammonia, until ferric chloride ceases to indicate salicylic acid in the washings, pure alkaloid remains on the filter. The filtrate contains traces of narceine, thebaine, the excess of sodium salicylate, and all the codeine and morphine. It is acidified with hydrochloric acid; after remaining some time the salicylic acid separated is filtered off, and the filtrate is repeatedly shaken with chloroform to remove the remainder of the salicylic acid, narceine, and thebaine; then the chloroform is removed by a gentle heat, the liquid is carefully neutralized and finally mixed with potassium thiocyanate solution. After twenty-four hours the precipitate consists of codeine hydrogen thiocyanate. The filtrate contains the morphine, which can be precipitated by slight excess of ammonia. In many cases the above methods can be employed quantitatively. Mixtures of narcotine and morphine precipitated with sodium acetate gave from 97·15 to 100 per cent. of the narcotine. Narcotine in presence of morphine, codeine, and thebaine gave 99·43 per cent. Papaverine precipitated by acetate in presence of morphine gave 98·15 per cent. of the total present. The same alkaloid in presence of morphine, codeine, and thebaine gave 97·02 per cent. In the two experiments where thebaine was present over 90 per cent. of that alkaloid was obtained by precipitating with sodium salicylate. The separation of papaverine by means of potassium ferrieyanide is very complete. Codeine cannot be quantitatively separated from morphine by means of potassium thiocyanate.

AMYLENE HYDRATE, A NEW HYPNOTIC.

BY PROF. J. V. MERING.

The new hypnotic which Professor v. Mering, of Strassburg, introduces to our notice (*Therap. Monat.*, July, 1887; *Med. Chronicle*, Sept.), is a tertiary amyl alcohol discovered by Wurtz. According to the *Pharm. Zeitung* (July 9th, 1887), it is prepared by heating amylenes (which contains trimethyl ethylene) with sulphuric acid. Amylsulphuric acid is formed, and this when distilled with water is converted into the new soporific which is now known to chemists as dimethyl-ethyl-carbinol, though v. Mering has thought it well to retain the older name. Amylene hydrate is a colorless fluid boiling at 100° C., and having a specific gravity of ·81. It is soluble in

eight parts of water, and has a peculiar ethereal odor, with a slight taste of camphor and an after taste of peppermint.

v. Mering first made experiments with the drug on frogs, rabbits, and dogs. He found that in all these animals it produced a condition resembling deep sleep. After some hours they again became conscious, and seemed none the worse for taking the drug. If rendered profoundly unconscious by a large dose, they did not react to external irritation. Doses sufficient to cause deep narcotism did not affect either respiration or circulation. Very large doses arrested both, paralyzing the respiratory centre and the heart's movements. From his investigations, he concluded that amylene hydrate first affects the cerebrum, but that very large doses depress the functions of the cord and medulla.

The satisfactory results obtained from the administration of moderate doses in the lower animals led v. Mering to try it on man, and during the past two years he has given it three hundred and fifty times to sixty patients, chiefly in cases of sleeplessness, connected with nervous disorders. In doses of fifty to eighty minims, he finds it to be a useful and safe hypnotic. In about half an hour after its administration it induces sleep which lasts six or seven hours. Only in four cases was it given without avail. No excitement precedes its soporific effect and no digestive disturbance is produced by it. When a patient wakes out of sleep brought about by amylene hydrate he feels perfectly well. In only one case was some giddiness complained of.

v. Mering has given the drug to old people and also to young children. He has given it too in those suffering from cardiac weakness and in some cases of lung disease.

The new hypnotic, he finds, is intermediate in power between paraldehyde and chloral hydrate; he estimates that two grams of amylene hydrate are equal to three of paraldehyde, but only to one of chloral hydrate. It is less unpleasant than paraldehyde, for its taste is less disagreeable and it does not cause the unpleasant odor of the breath following the use of paraldehyde. Though not so powerful as chloral it is safer, since it does not depress the heart's action. Moreover, it is not followed by discomforts, which at times occur after chloral hydrate. In only one case was a little giddiness complained of after the exhibition of amylene hydrate.

Amylene hydrate then may often be given with advantage instead of

chloral hydrate and paraldehyde. In common with these drugs it has the disadvantage that its action is uncertain when pain is present.

In rabbits it is excreted in combination with glyconuric acid. In man, as in dogs also, it seems for the most part burnt up as alcohol is.

v. Mering gives several forms for its administration :—

R. Amylene hydrate.....	7 gm.
Aq. destil.....	60 "
Extr. liquirit	10 "

M. D. S. Half to be taken in the evening before going to bed.

It can be given as an enema in the following form :—

R. Amylene hydrate.....	5 gm.
Aq. destil.....	50 "
Mucil. gum. acac.....	20 "

If pain be present it may be combined with morphine as follows :—

R. Amylene hydrate.....	6 gm.
Morph. hydrochlor.....	0 02 "
Aq. destil.....	60 "
Extr. liquirit	10 "

M. D. S. Half at bed time.

The drug is also sold in capsules, each capsule containing about fifteen minims. If impure it may cause headache, vomiting, and other unpleasant consequences.

KEFIR, A NEW KOUMISS.¹

Kefir can be made from the milk of different animals, but it is generally made from cow's milk. Fermentation is excited by the presence of the kefir, which is a species of mush-room, white when fresh, and yellow when old and dry, compact, elastic, and about one-fiftieth of an inch in diameter.

Chemically it is composed of water, fat, peptone, and nitrogenous material.

Examined microscopically it is composed of the rods and cells of beer-yeast.

It is found in the mountains of northern Caucasus near the snows. The natives believe that it is produced by the bushes which grow upon the mountain-tops. It is probable that the first origin is in the great

¹ *Le Practique Méd.*, No. 10; reprinted from *Medical News*, Aug. 27. See also *AMER. JOUR. PHAR.*, 1884, p. 196, and 1886, pp. 295 and 388.

number of bacteria which circulate in the atmosphere, and whose soil of development is furnished by the curds of coagulated milk.

At the beginning of the preparation of kefir the grains should be allowed to swell in tepid water for five or six hours—two teaspoonfuls to a tablespoonful of kefir grains; they should then be washed in cold water and put in half a glass of fresh milk, which is changed every three hours. The grains, which were yellow, become white, and are then ready for the preparation of kefir.

This is done by placing the white grains in a quart of fresh cow's milk, and the whole placed in uncorked bottles and exposed to a temperature of about 45° F., and frequently shaken. The milk begins to ferment soon, and in seven or eight hours the mass is fermented. The kefir grains are removed by filtering through muslin, the liquid replaced in bottles, which are only partly filled, and carefully corked.

The milk is left at a constant temperature, and shaken every two or three hours. Fermentation continues in spite of the absence of the ferment, and in twenty-four hours the drink is ready. The grains of kefir may be washed and used indefinitely.

Kefir is richer in albumen than koumiss, less alcoholic, and less acid.

The following table of analysis] shows the composition of milk, koumiss, and kefir:

	Cow's milk.	Koumiss.	Kefir.
Albumen.....	48	11.2	38
Butter.....	38	20.5	20
Sugar of milk.....	41	22.0	20
Lactic acid.....	...	11.5	9
Alcohol.....	...	16.5	8
Water and salts.....	873	918.3	905

Action of the sun's rays on glucose.—At a meeting of the French Academy of Sciences, M. Pasteur referred to some recent researches by M. Duclaux on the decomposition of sugar by the rays of the sun. This investigator had observed that when an alkaline solution of glucose, either in contact with the air or completely protected from the atmosphere, was exposed to the action of the solar rays, decomposition took place without the intervention of any ferment. Carbonic acid and alcohol were produced in just the same proportion as when sugar is fermented by yeast. This observation, although of no great practical importance, is of considerable scientific interest.—*Medical Times*, Aug. 20.

BRITISH PHARMACEUTICAL CONFERENCE.

The twenty-fourth annual meeting was commenced in Manchester, August 29th, by a reception by the President, S. R. Atkins, Esq., J. P., followed by a *conversazione* held in the Grand Hotel, Manchester. There was a very large and representative gathering of pharmacists, many of them accompanied by ladies, and the general approval which has again been manifested in respect to this innovation of holding a social meeting as a preliminary to the business of the Conference will doubtless secure the promotion of the experiment of the last two meetings to permanent rank. A foretaste of the executive quality of the local committee was afforded in the admirable arrangements that ensured the enjoyment and comfort of every visitor. The company listened at intervals throughout the evening to a choice selection of music, vocal and instrumental, whilst for tastes in another direction a very fine collection of microscopes and slides had been brought together, mainly, we understand, by the efforts of Dr. Thresh and Mr. J. Hart.

The Conference was held in the Chemical Lecture Theatre of Owens College, which was kindly lent for the purpose by the authorities of the college. On Tuesday morning, at about a quarter past ten, the chair was taken by the president, in the presence of a rather small attendance, which, however, rapidly increased, until the large lecture theatre was fairly full. The proceedings were commenced by Mr. G. S. Woolley, who said that in the much regretted absence of Mr. William Scott Brown, through ill-health, the duty fell upon him to welcome the Conference to Manchester on behalf of the local pharmacists. This he did in felicitous terms, and was followed by Professor Leech, who also greeted the members of the Conference on the part of the college authorities, saying that they had already shown their interest in pharmacy by establishing a complete course of pharmaceutical education in connection with Owens College. The welcome having been acknowledged by the chairman, a list of delegates from various associations to the Conference and several letters of apology for non-attendance were read.

The annual report of the executive committee was then read. A large portion of it was devoted to secretarial changes. A much smaller portion contained the important announcement that the formulary committee appointed at the last meeting of the Conference had, in conformity with the terms of its appointment, presented to the executive a "draft of what it recommends for publication as the first edition of an Unofficial Formulary." These results were now laid before the Conference, with a recommendation that the formulary committee should be re-appointed. The treasurer's financial statement showed that the members' subscriptions during the past year had amounted to £611 13s. 9d.; but that sum supplemented by the income on account of the "Year-Book" and Index, does not appear to have been nearly sufficient to maintain an equilibrium between the receipts and expenditure, and we gather from the statement that if all outstanding accounts had been paid the cash balance in favor of the Conference on June 30 last would have been about £150. The adoption of the report and financial statement was moved by the president, seconded by Mr. Kemp, and

agreed to unanimously without discussion. It is not probable that any useful purpose would have been served by an impromptu discussion of the work of the formulary committee, whilst it might have involved a considerable loss of time; but probably few who took part in the vote quite realized that they were sanctioning the publication of a draft they had not yet seen as the first edition of the Unofficial Formulary. This, however, was the subsequent ruling of the president.

Immediately after the adoption of the report the president brought before the members a suggestion that as the German Apotheker-Verein was then holding its annual meeting in Munich, a telegram of friendly congratulations from the Conference should be forwarded to that body. The suggestion was at once adopted with acclamation.

The way was now cleared for the presidential address, and that it proved to be an unusually eloquent oration will, with those who are acquainted with Mr. Atkins' powers, *va sans dire*. The dominant theme was suggested, as in innumerable other cases during the present year, by the "Jubilee." Fifty years of history in social life, in scientific progress, in craft organization! The field was not a narrow one, and time allowed only for the plucking of a handful here and there, certainly not for anything like a complete reaping. Manchester was appropriately chosen to illustrate the advance in social life. The score of express trains running daily between that city and the metropolis that have grown out of the tentative period of railway locomotion; the increase in the traffic between Liverpool and Manchester, which promises to bring to the inland city the privileges of a sea-port; the development of the industries that have made Manchester a household word throughout the world; and last, but not least, the increasing love for education, literary, technical and artistic, which has culminated in the Victoria University and the Exhibition at Old Trafford; all these were briefly mentioned. The speaker next invited his audience to follow him in a brief review of the Victoria era, as it more especially affected them as pharmacists, and he chose for his first topics the half century of chemistry and botany. But it must be confessed that this portion of the review was somewhat meagre, notwithstanding that it antedated the Victoria era considerably. Such a text indeed would have sufficed for many sermons and was decidedly too unwieldy to be moulded into a division of one. The president was more fortunate when he turned to another topic, the part played by the Pharmaceutical Society of Great Britain since its establishment in 1841. "The story has been well told," he said, "but I feel deeply, and at times sorrowfully, that it has not received the recognition it deserves." Emphatically, however, he insisted that disinterestedness was the prominent characteristic of those metropolitan pharmacists who headed the new movement; possibly, had he not himself have been so intimately mixed up with its more recent history, he might have applied the same epithet to those who still lead it on. A panegyric followed of the earlier leaders—Jacob Bell, Allen, Payne, Savory, Morson, and Dinneford, not omitting the still living Thomas Hyde Hills and George Webb Sandford—and then the speaker proceeded to consider how far the ostensible objects of the organization—educa-

tion, protection of interests, and relief of distress—have been attained. The Act of 1868, it was pointed out, has rendered the examination a necessary condition of registration, and for nearly twenty years the relative proportions of examined and unexamined men have been changing. As a means of fitting candidates to pass the qualifying examination Mr. Atkins evidently looks back with regret to the time when a seven years' apprenticeship was a more important factor in the production of skilled pharmacists than now. No doubt where the master himself was competent the old-fashioned apprenticeship afforded that opportunity for acquiring practical knowledge which is an indispensable preliminary to the proper application of the theoretical. But it must be remembered that although competent pharmacists may have been more ready to undertake the responsibilities of tutor fifty years ago than they are now, such men were not by any means ubiquitous; and in those days—as indeed it is still—it was not every “chemist and druggist” who took an apprentice—and his premium—who troubled himself, or was even competent to teach pharmacy. Mr. Atkins recognizes that education continues to be the question of the hour, but he professes great confidence in the law of supply and demand; this confidence, however, did not prevent him from admitting, in the next sentence, that the voluntary principle has, in this respect proved inadequate. Much of the present want of success in the examination room is attributable, in Mr. Atkins' opinion, to the unsatisfactory condition of middle-class education in this country, an opinion in which those who know the facts best will coincide. But notwithstanding this and other drawbacks, he holds that the hope of pharmacists in the future lies in cultivating the scientific rather than the merely trading side of pharmacy, for in this direction, from the nature of things, competition will be less acute, while remuneration for service given will be on a higher scale. Turning next to the history of the Conference it was pointed out that this body exists chiefly and preeminently for the prosecution of scientific research, and this was defined as the “investigation and revelation of all the facts and phenomena of the universal nature.” A big “blue-list” truly, and with a share in this wealth of subjects the Conference need never come to an end through the want of something to do. A few paragraphs were then devoted specially to the records of the past twelve months, and an eloquent peroration brought the address to a close. The burst of applause that greeted the speaker upon sitting down testified to the enjoyment which the meeting found during the delivery of the address, to which also Mr. Benger and Dr. Symes gave vocal expression in moving and seconding the vote of thanks that was unanimously accorded.

Strophanthus.—The reading of papers then commenced, the first communication read being a report by Mr. W. Elborne, on *Strophanthus* and *Strophanthin*, which was based on a research aided by a grant from the Conference, and was described as a continuation of a paper read by the author before the Pharmaceutical Society in March last. Mr. Elborne has operated on the greenish-brown variety of the seed known commercially as *S. Kombé*. The results obtained by him do not altogether correspond with those reported by other workers; for instance, the quantity of fixed oil

obtained by him from the seeds was only about two-thirds of the quantity obtained by Mr. Gerrard and Mr. Helbing. Such differences, however, he considers may be attributable to variations in the seeds operated upon. But a more important point appeared in his statement, that although in treating the seeds with absolute alcohol he obtained a larger yield of strophanthin than that reported by other observers, the seeds were still very imperfectly exhausted. He appears also to have observed some variation from the reported behavior of the glucoside with tannic acid. The author criticised Mr. Gerrard's process for the preparation of strophanthin, and suggested as an improvement either of two alternative processes, in both of which the seeds are first exhausted with water containing 10 per cent. of alcohol instead of absolute alcohol, and the use of tannic acid as a precipitant is avoided. He also suggested a modification in Professor Frazer's formula for the preparation of tincture of strophanthus. In the discussion that followed the reading of this report, Mr. Gerrard referred to the statement by Professor Frazer that strophanthin is crystallizable, and said that he also had succeeded in preparing it in the crystalline form, but the quantity was very small, and for some reason the compound rapidly decomposed. He also mentioned that in some oil from the seeds, after standing a time, he had noticed a crystalline separation, which ought to be the subject of experiment. Dr. Symes, referring to the tincture as being the preparation that would probably be used for the present, thought the preliminary treatment of the seeds with ether was hardly necessary, as proof spirit exhausted them without removing any appreciable quantity of oil. It was objected, however, by Mr. Elborne that such a preparation becomes cloudy on standing.

Catha.—Some contributions to the knowledge of catha leaves, by Professor Flückiger and Mr. T. E. Gerock, next came under the attention of the meeting. The greater part of this lengthy paper was of the historical and antiquarian nature that characterizes many of the writings of the senior author. Only the portion recording the results of the chemical examination therefore was read by Mr. Naylor. It appears that the first scientific notice of the plant was contributed rather more than a century ago by the Swedish botanist and explorer, Forskal, who reported that the Arabs ate the leaves greedily on account of their stimulating powers and the wakefulness they promoted; also that they believed the plague would not invade a place where the tree was cultivated, and that a man carrying a twig of catha in his bosom might safely go among the infected. A number of other quotations are given in the paper, tending to show that catha leaves are used by the natives of Arabia and Abyssinia in a similar manner and for a similar purpose as coca leaves in South America. The results of the chemical examination by the authors of a sample of catha are recorded in the last two or three paragraphs of the paper. About three pounds of the leaves were exhausted with water containing oxalic acid, the liquid neutralized with lime and shaken with light petroleum; the greater part of the petroleum was distilled off and the residue shaken with dilute hydrochloric acid; the acid solution was heated with lime in excess and then shaken with

ether, which on evaporation left about half a gram of a thickish oily yellowish matter that readily dissolved in acetic acid, the solution giving precipitates characteristic of alkaloids. A watery solution of the substance reddened phenolphthalein paper, but the redness quickly disappeared, in consequence, it is supposed, of the volatilization of the alkaloid, which it is proposed to call "katine." A crystalline acetate of katine was also stated to have been obtained. The authors confirmed previous statements as to the absence of caffeine.

Aconitine.—Continuing his experiments on the preparation of aconitine, Mr. John Williams has worked out a new process, a description of which he now communicated to the Conference. It consists essentially in exhausting with amyl alcohol the coarsely-ground root of *Aconitum Napellus* dried at a moderate temperature, shaking the amylic solution with dilute acid and water, and precipitating the acid liquor with sodium carbonate. The crude alkaloid is then dissolved either in ether or alcohol and allowed to crystallize. Mr. Williams especially insists upon the necessity of ensuring that the root operated upon is derived from *A. Napellus*, and he uses a fusel oil free from ordinary spirit. It will be noticed that Mr. Williams does not acidulate the percolating menstruum with tartaric or any other acid. Mr. Williams recommends that in the next edition of the pharmacopœia the alkaloid in its crystallized state should be authorized in the place of the amorphous aconitine now official. In reply to Mr. Holmes, the author said he was not quite sure as to the quality of the roots he had operated upon, as he had been dependent for his supply upon the ordinary market. But when Mr. Holmes had carried out the experiment he had undertaken on behalf of the Conference, and was in a position to supply aconite roots of undoubted botanic origin, he would be glad to repeat his experiments upon them. In reply to another question Mr. Williams said he believed the yield of crystallized aconitine by this process was larger than by any other, probably because there was not so much loss through decomposition.

The Conference then adjourned for luncheon.

Ipæcacuanha.—On resuming the second sitting of the Conference was commenced by the reading of a paper on the Estimation of Emetine in Ipæcacuanha, by Mr. F. Ransom. The principal novelty in this paper was the suggested use for the percolation of the root of chloroform rendered alkaline by shaking it with a strong solution of ammonia. The alkaloid is removed from the percolate by means of dilute sulphuric acid, and estimated with Mayer's reagent. The author has ascertained that contact with the ammoniated chloroform does not decompose the alkaloid. Ten samples of root tested by this process yielded proportions of emetine varying from 1.3 to 2.3 per cent., the average strength being 1.66. At the conclusion of the paper, Mr. Naylor expressed some surprise at the high results obtained by Mr. Ransom, and remarked that hitherto no published process had quite satisfied him, as they all, in his hands, had yielded varying results.

Mackay bean.—The enormous bean known as the Mackay Bean, the seed of *Entada scandens*, was the subject of the next communication, by Mr. John Moss. It consisted of an account of a chemical investigation of the

seed made with the object of isolating a poisonous principle that it was alleged to contain. No very definite result, however, has been arrived at, beyond establishing the probability of the occurrence of saponin in the aqueous extract, and the obtaining of three or four microscopic crystals, which it is hoped may be the beginning of a crop that will eventually be large enough to allow of their proper examination. Some question having been raised as to whether the substance occurring in the aqueous extract was really saponin, Mr. Holmes remarked that the root of the plant is used in the Philippines as a washing material.

Blaud's pill.—The already bulky literature on Blaud's pill next received an addition in the shape of a report by Mr. T. Maben, which may be looked upon as a kind of bye-product of the formulary committee. Mr. Maben is one of the majority who believe that the intention of the prescriber in ordering Blaud's pills, is to administer ferrous carbonate, and that the ferrous carbonate should be formed before the ingestion of the pill. Notwithstanding the authority of the Codex, Mr. Maben prefers to use the crystalline sulphate, and he trusts mainly to a coating of gelatin to prevent oxidation after the pill is made. The formula recommended by Mr. Maben is practically the same as that adopted in the Unofficial Formulary. Mr. Martindale said that Mr. Maben's formula allowed of presentable pills being prepared quickly, but they would not keep well. He expressed a preference for the iron pills of the Pharmacopœia, but it was pointed out by Dr. Symes that medical men continue to order Blaud's pills, and pharmacists have to prepare them. In reference to a suggestion by Mr. Martindale that better results were obtainable by heating the mass than by beating it, Mr. Naylor remarked that by beating he had obtained a product containing pill for pill more ferrous carbonate than the official pill.

Vesicating beetles—The next note, on "Two Species of Vesicating Beetles from South Africa," by Mr. J. O. Braithwaite, was another communication of practical value. It described the results of an examination of some "blistering flies", that had recently been consigned from South Africa. The sample consisted of two species of *Mylabris* which have been identified as *M. bifasciata* and *M. lunata*. The author reported that he had ascertained that the former of these is extremely rich in cantharidin, containing more than twice as much as *Cantharis vesicatoria*, and he suggested that as the beetle is plentiful at the Cape it might prove an economic source of the vesicant. *M. lunata* proved to be much poorer in cantharidin. After the paper had been read, Mr. Moss stated that another species of *Mylabris* is at present used as an important source of commercial cantharidin.

English-grown rhubarb.—A very brief note was then read by Mr. W. Elborne, in which he called attention to samples of English-grown roots of *Rheum officinale*, pointing out the great similarity in appearance and general characters existing between them and the dark-veined variety of the East Indian imported drug.

Oil of evodia.—The object of the next paper read, which was by Mr. H. Helbing, was to add oil of evodia to the list of deodorants of iodoform. The oil, which is derived from the fruit of the *Evodia fraxinifolia*, a ruta-

ceous plant, native of Nepal, was described as having an exceedingly agreeable and intense odor similar to bergamot. Its specific gravity does not exceed .840, and it is soluble in ether and alcohol and has a pungent taste. The fruit on distillation yields about 4 per cent. of the oil. Some conversation arose as to a possible supply of the oil, but this was somewhat checked by the doubt expressed by the president, after examining the samples, whether the oil answered to the claim put forward on its behalf.

Cryptopine and its salts are substances not very familiar as a rule to even accomplished pharmacists, although some attention has been directed recently to the alkaloid in respect to its remarkable gelatinizing property. In the paper next read, Dr. Kauder contributed the results of his chemical experience in preparing the alkaloid and its salts. The physiological history of the compounds, however, does not seem to have been yet begun.

This brought the second sitting of the Conference and the first day's business to an end, a large number of members upon the adjournment of the meeting proceeding in carriages provided for the purpose to visit the Jubilee exhibition.

Relation of pharmacy to medicine.—The third sitting of the Conference was held on Wednesday morning, the proceedings commencing with the reading of a paper on the relation of Pharmacy to Medicine by Professor Leech, lecturer on *Materia Medica* in Owens College. At first it seemed as if the paper was intended as a panegyric upon wholesale-made "palatable" preparations of medicine, but after a time this found an explanation in the evident impression of the speaker that the "new commercial industries" that have arisen and "have absorbed some of the work formerly done by individual pharmacists" always result in an output of definite preparations of known composition. According to Professor Leech "the present system of education leads medical men to prefer ordering medicines which they know are made up in a palatable form to devising combinations which may not be so pleasant for their patients as they would wish;" whilst "a large proportion of those on whom powers to practice are conferred have little idea of the best methods of ordering medicines or of the physical results they may obtain by the association of the drugs they wish to give." This necessity for a devolution of responsibility however, though it may be urgent, can hardly be fairly charged against the pharmacist. We think it may be correctly asserted that it will be only necessary for the medical profession to formulate exactly what it wants to ensure a supply as far as is possible from the ordinary pharmacist, and that the difficulty is evaded rather than overcome by the prescribing of "palatable" or "convenient" preparations the exact composition of which in many cases is known only to the manufacturer. As Professor Leech's argument was developed, however, it became evident that his demand is for pure medicaments of definite or known composition, and the necessity for these he illustrated experimentally in a most interesting manner, by showing the influence of a very dilute solution of veratrine on muscle. It seems to us that a greater part of the author's argument might be appropriately addressed to the representatives of the medical profession. If it be true that "the want of reliance on the

uniformity of our official preparations is leading medical men to those large houses in America and Germany, as well as in England, who guarantee that their compounds are of a definite strength," it is desirable that the mischief should be at once brought under the notice of the medical body that at present entirely controls the formulæ of the Pharmacopœia. It is impossible, however, just now to do justice to the many points that are worthy of discussion in this most interesting address, but we shall probably refer to them when the address is published *in extenso*. Meanwhile, we entirely endorse the opinion, that "if pharmacy is to hold its own, each pharmacist must be in the future the guarantor of the purity of the medicines he dispenses, not the mere distributor."

The estimation of small quantities of salicylic acid in wines, etc., was the subject of the next paper, which was by Mr. W. H. Ince. The method preferred by the author is to distil the liquid after acidulating it with sulphuric acid, reject the first portion passing over, then treat a definite quantity of the subsequent distillate with a 10 per cent. solution of mercuric nitrate in nitric acid or ferric chloride, and compare the liquid colorimetrically with solution of salicylic acid of known strength treated with the same reagent. The author states that he has found distillation in a current of steam "a satisfactory method of extracting a definite quantity of the acid from a definite volume of wine or similar body."

Testing and purification of hydrochlorate of cocaine.—Mr. John Williams next attempted to deal with a difficulty presented by this now widely used alkaloid. The purification process recommended by the author depends upon the almost absolute insolubility of hydrochlorate of cocaine in ether, in which cocaine itself is freely soluble, and the fact that most if not all of the impurities appear to be soluble in ether even when converted into hydrochlorate. The cocaine hydrochlorate to be examined is dissolved in the smallest quantity possible of absolute alcohol, and to this solution is added about six times its volume of pure ether; after shaking several times the mixture is allowed to stand a few minutes and the crystalline precipitate is then thrown on a calico filter, squeezed, spread on blotting paper and allowed to dry. The cocaine hydrochlorate thus purified is said to be much improved and free from the mousy odor so often complained of. In the discussion that followed the reading of the paper Mr. Christy referred to the fact that a considerable quantity of crude cocaine now received in this country from South America pays a visit to Germany for purification, and said that the publication of Mr. Williams' paper would appear to render this unnecessary in future. The question was also raised as to the preservation of cocaine in solution, and Dr. Tichborne stated that a slightly acid solution of salicylate of cocaine would keep good for twelve months.

Synthetical compounds.—Mr. Helbing next read a paper entitled *Pharmaceutical Notes on some Synthetical Compounds recently introduced into Medicine*. The paper was mainly a compilation of statements which have already been published in this Journal concerning the numerous organic compounds with which continental physicians and chemists have recently inundated the materia medica. It contained also some useful information

as to the best methods of dispensing some of these compounds, and as the paper was illustrated by samples of several of the substances referred to, it was much appreciated. Nevertheless, a perhaps too captious critic might suggest that it was not without objectionable features as a paper read before the Conference.

Camphor oil was next brought before the Conference in a paper by Mr. P. MacEwan, who, having examined numerous samples of the oil during the last two years, has been struck with the great range of quality they exhibited. Some were almost colorless, others very dark, and their other physical characters showed great variations. Some experiments have led him to the conclusion that high specific gravity and dark color are indicative of the absence of camphor. Mr. MacEwan considers it desirable that camphor oil should be brought to approximate uniformity before it reaches the hands of the retailer, by excluding the dark and heavy oils, bulking the remainder and submitting it to distillation to get rid of all that will distil below 170° to 175° C., which would be still useful for varnish making. Mr. Moss mentioned that in the distillation of crude oil, which is carried out to a considerable extent for the sake of the camphor it contains, a fraction is obtained resembling safrol, and he believed that a great proportion of this constituent finds its way into commerce as oil of sassafras. Another portion of the distillate, he had been informed, resembled eugenol, the heavy constituent of oil of cloves, and although occurring in small relative proportion the total yield is large, as the quantity of the oil distilled is enormous.

Some fundamental errors in the British Pharmacopœia.—Dr. C. R. C. Tichborne commenced with an admission that as a whole very few books containing so much condensed work are so free from errors as the British Pharmacopœia. The "fundamental errors" referred to and illustrated in the paper were those due to the fact that whilst the Pharmacopœia provides that all measurements shall be made at 60° F., the imperial measures used are graduated at the legal temperature of 62° F., and the metric measures are properly graduated at 39.2° F.

Another spurious cubeb was the subject of a histological paper by Mr. Kirkby. It appears to agree more closely with Flückiger and Hanbury's description of *Piper crassipes* than the false cubeb described by Mr. Kirkby in this journal, which has been referred to that species. To distinguish them, therefore, he at present speaks of the earlier one as the short-stalked variety. Mr. Holmes mentioned the interesting fact that he had recently examined a sample of cubeb of the best quality he could obtain, and that he had found it to contain the different spurious "cubeb" that have been described, and he was inclined to believe that the cubeb of the present day consist of mixtures of genuine and spurious fruits. Dr. Symes said that many samples of powdered cubeb when triturated with water showed a considerable separation of gritty and sandy matter, and one sample of powder yielded to him upon incineration as much as twelve per cent. of ash.

The chemistry of the nitrites and of nitroglycerin, by Dr. G. Armstrong Atkinson, was supplemented to one by the same author on the "Pharmacognosy of the Nitrites," that appeared last year in *Pharm. Jour.*, [3], xvii.,

1. Referring to the unsuitability of nitrous acid for medicinal use on account of its instability in contact with water, the author stated that he has found experimentally that watery solution of nitrous acid of the strength of one in one thousand, kept in a stoppered bottle half filled, is reduced in strength in a few hours to one in three thousand, the decomposition being into nitric acid, nitric oxide and water. A preparation sold as "*acidum nitrosum*," and sometimes used in medicine, was pronounced to be merely a solution of a variable proportion of nitrous acid in nitric acid. The only possible form in which, in the author's opinion, moderately pure nitrous acid can be conveniently exhibited as a medicine is as an aqueous solution not stronger than one in three thousand, with a little glycerin added to retard decomposition. But the free acid presents no advantages over nitrite salts, which are readily decomposed by the acid of the gastric juice, whilst the nitrites of sodium and potassium are readily soluble in water and the solutions are perfectly stable if kept free from fungoid growth; the sodium salt is, however, considered the more suitable for therapeutic use. Nitrite of ethyl, incidentally stated to be the earliest known nitrite, was next considered, especially in reference to the question whether nitric acid free or combined, occurs in it. This was answered in the affirmative, all the specimens examined having contained it, as well as old samples of spirit of nitrons ether from which all nitrite had disappeared. Nitrite of amyl, when recently prepared, has been found by the author to contain usually from seventy-five to eighty per cent. of the actual nitrite; all the samples examined contained at least traces of nitrate, and some old ones contained considerable quantities. In the latter part of the paper some points in connection with nitroglycerin were discussed, especially its qualitative and quantitative analysis. This concluded the business of the third sitting.

Morphine derivatives.—The fourth and last sitting was commenced with the reading of a paper on the Chemistry and Pharmacology of some of the Morphine Derivatives, by Messrs. Dott and Stockman, which, although containing a record of much valuable and interesting work, hardly lends itself to intelligible condensation. The first compound dealt with was methylmorphine, or codeine, and it was stated that the alkaloid artificially prepared from morphine, and which has been already shown to correspond with codeine from opium in chemical and physical properties, agrees with it also in physiological action. In dimethylmorphine the chemical change is attended by a complete modification of the symptoms characteristic of the morphine group. Ethylmorphine does not differ essentially in physiological action from the corresponding methyl base, codeine; but the introduction of the acetyl group slightly increases the narcotic and tetanizing action.

Pharmacy of logwood, by Mr. Louis Siebold. The object of this note was to deal with the questions: What is the best logwood for use in pharmacy? What is the nature and condition in which this wood is intended by the authors of the Pharmacopœia to be employed? Are these intentions fulfilled in practice? In reference to the first question the author thought that Campeachy or Honduras was much more suitable for use than the inferior

kinds obtained from San Domingo and Jamaica. As to the condition in which the wood was to be used the Pharmacopœia was silent, and ignored the fact that the wood in logs and that ordinarily sold in chips or in the form of a coarse powder, were most essentially different from each other from a chemical point of view, since the ground wood or chips as met with in commerce had undergone a long process of fermentation by being laid up with water in heaps and exposed to the air for weeks. The great difference between the two was well known to those engaged in dyeing and calico-printing, and to technical chemists acquainted with these processes; but it was little known to and not at all appreciated by pharmacists. The author fully explained the difference in the chemical nature of the two woods, and expressed the opinion that the fresh or unfermented wood ought only to be used in pharmacy, the aged or fermented wood being very unsuitable for the decoction and the extract, especially for the latter, both from a pharmaceutical and from a medical point of view. He had no doubt in his mind that the framers of the Pharmacopœia meant the unfermented wood, as this alone had the sweetish taste alluded to in the characters. The last question he answered in the negative, asserting that fermented chips were almost exclusively used by pharmacists and wholesale houses for the B. P. preparations. Unfermented chips were rarely met with in commerce, and, to his knowledge, were never sold to retailers. He thought that pharmacists or wholesale druggists should prepare their own extract, as that imported so largely from France and America was not pure enough for pharmaceutical purposes. He would recommend in the place of the extract a liquor hæmatoxyli, representing its own weight of wood, which after settling was an elegant and very permanent preparation. He gave full details as to how this should be made.

Logwood as a reagent.—Mr. Siebold also read a Note on the Application of Dyewoods in Chemical Analysis. He said that much had been written regarding the application of logwood tincture for the detection of alum in bread and of traces of heavy metals in potable water; but it had never been properly pointed out what kind of logwood should be employed for such purposes. He recommended the use of aged or fermented wood for the preparation of the tincture intended for testing, since its indications were far more delicate. He showed experimentally how this test could be made to show the presence of one part of copper in four millions, one of aluminium in seventeen millions, and one of tin in the same proportion of water; also, how it should be best applied for the detection of alum in flour and bread. He also warmly recommended the fustic test described by Goppelsroeder for the detection of traces of aluminium in colorless liquids.

Examination of cacao butter, by Mr. E. J. Millard. This paper at first dealt with the statement in the British Pharmacopœia that the melting point occurs "usually between 30° and 35° C.," the author affirming that starting with an original sample of pure cacao butter, the melting point of which was 33° C., he had found that the addition of as much as ten per cent. of paraffin, wax or tallow, only varied the melting point slightly outside the limits officially given as "usual." Better results were obtained with the test given in the

United States Pharmacopœia, which depends upon the behavior of the fat dissolved in ether and submitted to different degrees of temperature. Eighteen commercial samples were examined according to this test and only two came under even the shadow of suspicion.

Quinological work in the Madras cinchona plantations.—Mr. David Hooper supplied another convenient summary of results obtained in further experiments carried out by him in his capacity of quinologist to the Madras government. The first series of twelve analyses referred to, showed that bark from trees of the same age and growing in the same situation might vary in alkaloidal strength, the figures ranging from 1.75 per cent. to 3.90 per cent. of quinine, and from none to 0.16 per cent. of quinidine. It also seems probable that there is no advantage in raising only one stem from a coppiced tree. Bark from the same twelve trees, examined in each consecutive month, showed that in the six months next following the original stripping there was a decrease of alkaloids in the bark left, as if the tree had suffered in this respect from the shock of the operation; but in the seventh month recovery had well set in, and by the twelfth the bark was richer than it had been a year before. Incidentally, it was also observed that March is the month in which cinchona bark appears to be richest in alkaloids. Some further experiments as to the effect of manuring cinchona trees, seem to show that bone manure and cattle manure are best suited for the purpose, though the improvement of the bark in quinine was in no case more than 14.58 per cent. Another experiment as to the extent to which renewal of bark can be profitably carried appears to show that the maximum in the case of a hybrid Ledger plant had been reached with the third year's renewal, although the fourth renewal still resulted in a rich bark.

Crude carbolic acid and its substitutes.—Mr. A. H. Allen commenced by referring to the elastic manner in which titles suggestive of carbolic acid are frequently applied to preparations from which that substance is entirely absent. But the evident object of the paper was to bring under the notice of the Conference a product that is now obtained in enormous quantities in the condensation of the waste gases from blast furnaces consuming bituminous coal, which, according to the author, consists of phenoloid bodies resembling more closely the creosotic products from wood tar than the coal tar acids. This product, for which the commercial name of "neosite" has been adopted, was described and exhibited.

The president then in appreciative terms referred to the work done by the Unofficial Formulary Committee, especially referring to the services rendered by the chairman, Mr. W. Martindale, and the secretary, Mr. W. A. H. Naylor. He concluded by moving the reappointment of the committee. The motion was seconded by Mr. J. Williams and agreed to unanimously.

The presentation of the gift of books provided by the Bell and Hills fund, was then made by the president, and acknowledged by Mr. Wilkinson, as vice-president of the local association.

The president announced that, following the usual custom, the Conference would meet next year in the same place as the British Association, and that would be the city of Bath.

The election of officers for the ensuing year then took place by the tendering of a single vote for the list proposed by the Executive Committee, which was as follows:—

President.—Mr. F. B. Bengier.

Vice-Presidents.—Messrs. M. Carteighe, C. Symes, S. Plowman and W. Martindale.

Treasurer.—Mr. C. Umney.

Honorary General Secretaries.—Dr. J. C. Thresh and Mr. W. A. H. Naylor.

Committee.—Messrs. W. Allen (Dublin), M. Conroy (Liverpool), R. H. Davies (London), D. B. Dott (Edinburgh), A. W. Gerrard (London), T. Maiben (Hawick), N. H. Martin (Newcastle), F. Ransom (Hitchin), and G. S. Woolley (Manchester).

Auditors.—Messrs. W. Wilkinson (Manchester), and E. J. Appleby (Bath).

A vote of thanks to the local committee, and especially to Messrs. Woolley, Bengier, Hart, Kemp and Wilkinson, for the manner in which they had carried out the arrangements, was moved by Mr. Schacht, seconded by Mr. Martindale, and carried by acclamation. It was acknowledged by Mr. Wooley, Mr. Bengier and Mr. Wilkinson. This was followed by a hearty vote of thanks to the authorities of Owens College, which was moved by Mr. R. Reynolds, and seconded by Mr. D. B. Dott. Still another vote of thanks was accorded to the executive committee of the Jubilee Exhibition for its courtesy in inviting the members of the Conference to be present at a conversazione.

The proceedings terminated with a hearty vote of thanks to Mr. S. R. Atkins for the admirable way in which, as president, he had conducted the business of the meeting. This was moved by Mr. Conroy and seconded by Mr. Balkwill, and after having been carried with great applause, was acknowledged in suitable terms. This brought to a close the business of one of the most successful meetings of the Conference, which was also the most numerously attended, the number signing the attendance book having been two hundred and forty-nine.

Early on Thursday morning the weather was fine enough to have made the excursion to Matlock Bath a perfect success if it could have been trusted to continue throughout the day; but even before the time appointed for meeting at the Central Railway station, heavy threatening clouds obscured the sun, and made the prospect less encouraging. Nevertheless, a large proportion of the Conference visitors gathered together and took their places in the special train, provided for conveying them to Matlock, where the programme which had been arranged for their entertainment, was carried out very successfully, notwithstanding some sharp showers of rain.—*Phar. Jour. and Trans.*, September 3, 1887.

AMERICAN PHARMACEUTICAL ASSOCIATION.

The thirty-fifth annual meeting convened for the first time on a Monday, all the previous meetings having been held on Tuesdays, with the exception of three or four, which commenced on Wednesdays. Under the by-laws the Council is required to meet on the day preceding that fixed for the assembling of the Association, and in accordance with this provision a session was held during Sunday evening, September 4, at the Grand Hotel in the city of Cincinnati, and another session on the following morning.

The "Odeon" had been selected by the Local Secretary, G. W. Voss, and the local Committee of Arrangements, and proved to be well adapted for the purpose. Located on a principal thoroughfare, but a short distance back from the street line, the noise of passing vehicles was inaudible in the hall, and could not interfere with the deliberations, and while the hall is spacious enough to have accommodated a much larger audience, the means of access to the seats are so numerous and convenient that visitors could enter or depart without disturbing the discussions; moreover, with little effort on the part of the speakers they could be easily heard by all present.

When the meeting assembled shortly after three o'clock, the first Vice-President, Dr. H. J. Menninger occupied the chair, in the absence of President Tufts, and introduced Hon. A. Smith, Mayor of Cincinnati, who bid the Association a hearty welcome, and expressed the wish that the meeting would prove a benefit both socially and intellectually. In replying the vice-president referred to the fact that this was the third meeting held by the Association in Cincinnati during thirty-two years. Subsequently he read an address which had been prepared within the short time since notice had been received of the inability of the president to be present at this meeting. It was mainly devoted to the labors of the Committee on Management by whom a plan would be presented, allotting specified time for the consideration of the several subjects which naturally should engage the attention of the Association, as had already been contemplated at the organization in 1852, when an elaborate report by Wm. Procter, Jr., Sam. M. Colcord and Geo. W. Coggeshall had been presented, which outlined the scope of the proposed organization, as was shown by several appropriate quotations. The vice-president also alluded to the condition of the treasury, which not many years ago was almost empty, but at present shows an available balance of nearly \$12,000. "This meeting will, I hope," said the vice-president in conclusion, "by the adoption of the plan presented by the Committee on Management, be the beginning of a new era of prosperity and usefulness. While these recommendations of the committee are being discussed, let me hope that opposing views will be advocated in the true spirit of the educated man, and that the judgment which you will render may illustrate your temper at the time that it was done, with malice toward none and with charity toward all."

The Secretary of Council read the names of thirty-one candidates for membership, after which the reports of standing and special committees were read by title, and the report on credentials was read in full, showing

that delegates had been accredited from the following colleges of pharmacy: Chicago, Cincinnati, Cleveland, Louisville, Maryland, Massachusetts, National (Washington, D. C.), New York, Philadelphia, Pittsburg and St. Louis; from the State Pharmaceutical Association of Alabama, Arkansas, Connecticut, Florida, Illinois, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, Wisconsin, and the Province of Quebec; from the county or city associations of Kings county, N. Y., Berrien county, Mich., Detroit and Nashville, and from the alumni associations of the colleges of Chicago, Cincinnati, Louisville, New York, Philadelphia, St. Louis, and the University of Michigan. At subsequent sessions several additional credentials were presented.

The Nominating Committee was then appointed by the selection of one member of each delegation from colleges of pharmacy and state associations, and the committee was authorized to receive the representatives of other delegations from such bodies who may arrive in time for participating in the labors of the committee. The following non-delegates were appointed by the chair; J. P. Remington, of Pennsylvania, Leo Eliel, of Indiana, John Weir, of Ohio, G. H. Schafer, of Iowa, and D. S. Carraway, of Tennessee.

The minutes of the Council since the last annual meeting were read by the secretary, and were on motion approved. In this connection the various reports spread upon the Council minutes were read, among them a very thorough one by the Auditing Committee Jos. L. Lemberger, Henry Canning and Linus D. Drury, who had closed the books of the former treasurer preceding their being turned over to the new treasurer. The committee had found numerous discrepancies in the accounts, leaving a balance of \$2195 due to the Association from the former treasurer. The present treasurer subsequently reported that this balance had been paid over to him in full. The committee's report had been printed by order of the Council, and copies of it were distributed to the members present.

The three members of the Auditing Committee, having performed the tedious labor assigned to them, without asking any recompense therefor were elected life members by the Council, who ordered that the requisite sum for this purpose, \$120, be transferred from the general to the permanent fund.

The Council had also instructed the treasurer to arrange with a reliable insurance company for a bond by \$5000—which sum was subsequently increased to \$10,000 by the association. It had also been decided to publish annually in the Proceedings a complete list of all dues received by the treasurer during the preceding year. Three members, who had waived their right to life membership under the old constitution, were made life members, old style, without claim to the Proceedings.

The last Auditing Committee's report showed the total receipts of the treasurer up to July 1st, to have been \$13,276.14, and the expenditures \$8,556 70, leaving a balance in bank at the date named of \$4,719.44. The investments were reported as follows: Ebert fund \$600—; Centennial fund \$1100—;

Life-membership fund \$3700—; but the market value of each \$100 bond was \$128.25. In addition to the bonds a small cash balance remains in a saving bank to the credit of each fund. The association subsequently directed \$4000 to be transferred from the general fund for permanent investment, to the life-membership fund.

The report of the Committee on Management, contemplating numerous changes in the by-laws, was read at the first session, and then laid over for further consideration; it was printed for the information of the members present.

The second session was held on Tuesday morning, and after a recess, continued in the afternoon of September 6. A partial report was presented by the Nominating Committee, and the following officers were duly elected:

President. John U. Lloyd, Cincinnati.

Vice-presidents. M. W. Alexander, St. Louis; A. K. Finlay, New Orleans, and Karl Simmon, St. Paul.

Treasurer. S. A. D. Sheppard, Boston.

Permanent Secretary, John M. Maisch, Philadelphia.

Reporter on Progress of Pharmacy, C. L. Diehl, Louisville.

After the installation of the officers, the reports of Standing Committees on Legislation and on Prize Essays were read, the latter recommending the Ebert prize to be awarded to Professor Emlen Painter for his essay on spirit of nitrous ether read last year; the recommendation was adopted.

Messrs. MacMahan, Sloan, Baker, Good and Fennel were appointed a committee to report on the time and place of the next annual meeting. Subsequently Detroit was recommended and after much discussion, this recommendation was adopted, the Council being requested to appoint the time.

Reports were also presented from the Committees to visit the National Wholesale Drug Association; on the introduction of foreign medicinal plants; on national formulary of unofficial preparations; and on resolutions presented to the American Medical Association.

The recommendations of the Committee on Management were next considered seriatim and adopted with little or no alteration. Considerable discussion was occasioned on the manner of constituting the nominating committee. A proposition was made to have the members of this committee appointed by the State Associations only, ignoring the colleges of pharmacy, by whom the Association itself was organized. Other propositions favored the nominations being made in the open meeting, or the returning to the practice abandoned in 1885, to give to each association of pharmacists a representation on the nominating committee. Finally it was agreed that no association should have the right to make these appointments, but that each State shall be represented on that committee by two members; the manner in which these representatives are to be selected was not stipulated, but it is evident that the plan adopted is in all its essential features the same as the one proposed by the Squibb in 1880, which had the additional advantage of providing for the manner in which the selection was to be made. Under the new plan a State, (or territory or province), will be entitled to

representation on the Nominating Committee, although there may be no local pharmaceutical association in the State.

The main features of the new arrangement which went into effect at once, may be stated as follows: Two sessions at the beginning and the terminal session of each annual meeting are to be devoted to routine work and to general business. All other subjects are to be brought up before meetings specially arranged for this purpose. With this end in view four sections have been created, on commercial interests, on scientific papers, on pharmaceutical education, and on pharmaceutical legislation. Each section elects its own chairman, secretary and committee the latter to prepare business for the coming year. No money can be appropriated by any section, unless approved by the Association in general session. For the present two sessions are to be devoted to commercial interests, three to scientific discussions, and one each to education and legislation, the last two sections to meet successively, or, in case of necessity, simultaneously. A member of the Association may participate in the deliberations of any one or all of the sections.

An effort was made to amend the by-laws so as to allow any one of them to be suspended by a vote of three-fourths of the members present, but the Association very wisely rejected this proposition, which might have opened the door again for confusion similar to that noticed at the meetings for some years past, and which the various measures adopted of late years were unable to prevent. With the prospect of securing better work in the future in consequence of this separation of the labor into distinct portions to be attended to at specified times, the Association passed, unanimously, a hearty vote of thanks to the committee that had elaborated the plan.

The report of the Committee on National Formulary was next taken up, and the various recommendations were considered and adopted with some modifications. The work will be stereotyped and printed as part of the Proceedings, and in addition to this a separate copy of the formulary will be furnished to each member. The question of copyrighting the work was referred to the Council, and this body resolved that the work be copyrighted, but that the reprinting of any or all of the formulas, in an unmutated condition, be not prevented.

Preceding each session of the sections no general business can be transacted, under the new rules, except election of members.

The Section on Commercial Interests held two sessions on Wednesday forenoon, and organized by the election of A. H. Hollister, of Wisconsin, chairman, and J. W. Colcord, of Massachusetts, secretary. The Committee on Commercial Interests was completed by the election of E. A. Sayre, of New Jersey; W. H. Rogers, of New York, and A. K. Finlay, of Louisiana.

A resolution was offered by M. Hallberg, and referred to the committee for report next year, requesting manufacturers and dealers to label their products in conformity with the official nomenclature, and to designate strengths by the specific gravity or percentage strength, thus abolishing arbitrary signs and obsolete standards, such as "F" marks and degrees Baumé.

The removal of the special tax on druggists for selling alcoholic liquids,

and the abolishing of the revenue tax on alcohol to be used for manufacturing purposes, were subjects creating much discussion. A motion was made by Mr. Canning and amended by Mr. Schafer, that the Committee on Commercial Interests be instructed to confer with the National Wholesale Drug Association and the various State associations with reference to memorializing Congress to remove the twenty-five dollar internal revenue license on alcohol when sold by pharmacists for the actual necessities of medicine.

An amendment was offered by Mr. W. S. Thompson, that Congress be requested to abolish the special license tax on alcohol. After further discussion the amendment was accepted by a vote of 37 ayes to 22 naves, and the amended motion was then adopted.

The *Section on Scientific Papers* held three sessions on Wednesday afternoon and Thursday, and organized by the election of T. Roberts Baker, of Virginia, as chairman; A. B. Lyons, of Michigan, as secretary, and J. M. Good, of Missouri, as third member of the committee.

Vanillin and Extract of Vanilla was the subject of the first paper read by Clay W. Holmes. Solutions of vanillin of European and American manufacture were made, also of coumarin, and compared with an extract of vanilla of the customary strength, one ounce to one pound. It was ascertained that vanillin will produce an artificial extract resembling that of vanilla, but not of the strength indicated by the manufacturers. However, since the vanillin of commerce is an artificial product, not prepared from vanilla, the author thinks that its solution should be sold under its proper name, and he states that a dealer selling it in the State of New York as extract of vanilla would be violating the adulteration of food law. During the discussion which followed, it was stated that one ounce of vanillin may be regarded as producing an equally strong flavor as one pound of vanilla, but that the former was accompanied by a foreign odor which cannot well be described, but was called "pine-odor."

Fluid Extract of Liquorice-root, by G. W. Kennedy. For sixteen troyounces of liquorice-root a menstruum is recommended, consisting in the beginning of a mixture of alcohol, five fluidounces, glycerin, three fluidounces, water, seven, and ammonia water, 1 fluidounce; the percolation is finished with diluted alcohol; the first twelve fluidounces of percolate are reserved, the weaker percolate evaporated to four fluidounces, and this is mixed with the reserved portion. It is claimed that the above amount of ammonia is sufficient to prevent precipitation of glycyrrhizin, and that the addition of glycerin improves the appearance of the fluid-extract and contributes to its permanence.

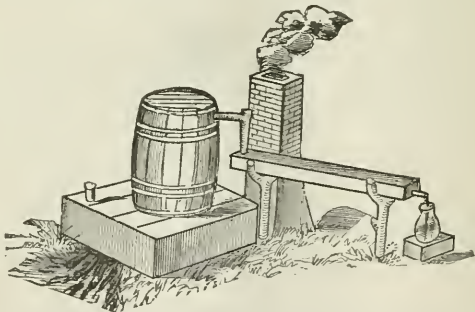
Prof. Diehl stated that the amount of ammonia directed by the pharmacopœia was about correct for the pharmacopœial process, the excess being volatilized in evaporating the weak percolate. Mr. Ebert had observed that a much better fluid-extract of liquorice-root is obtained if heat be avoided; for the flavoring of tobacco a serviceable extract had been prepared by the use of lime-water, which was considered much superior to that made with ammonia. Prof. Lloyd had observed that different samples of liquorice-root required different amounts of ammonia. Prof. Remington called atten-

tion to the change in the menstruum of the completed preparation, as proposed by Mr. Kennedy, which would induce precipitation. That the pharmacopœial fluid-extract is not clear was stated by Mr. Klie, who favored making this preparation by repercolation.

Reference was also made to wild liquorice-root of the southern States, which is used in some places to a considerable extent, and is said to be very similar to the officinal drug; it is probably obtained from *Glycyrrhiza lepidota*, and an investigation of the subject was promised by Mr. Carraway.

Liquor Gutta-perchæ was the title of the third paper read by Professor Good, in which he recommended in the place of the pharmacopœial process, to dissolve four parts of select gutta-percha in ninety-six parts of chloroform and filter the solution through patent textile filtering paper; a solution containing five per cent. of gutta-percha may be readily filtered. By the use of dentists' white purified gutta-percha filtration would be avoided; but this article is sold at \$1 per ounce, while good gutta-percha can be purchased for \$2, and traumaticin for \$2.75 per pound. Prof. Painter stated that a solution of gutta-percha in commercial benzol readily deposits the impurities contained in the former, thereby becoming perfectly transparent; this may be employed, or the dissolved portion may be easily obtained by evaporation.

Agents for Making Hydro-alcoholic or Aqueous Solutions of Volatile Oils, by Prof. C. O. Curtman. Talcum, purified by boiling with dilute hydrochloric acid and washing with water, was found to be the best material for preparing medicated waters and allied solutions of volatile oils; next comes "kieselguhr," which, however, requires to be employed in somewhat larger quantities; and nearly equal to this is the Richmond diatomaceous earth, while calcium phosphate is not eligible. A lengthy discussion followed the read-



ing of this paper, with reference to the use of magnesium carbonate, calcium phosphate, glass-wool, paper-pulp, and other materials recommended for dividing the volatile oil, and of hot water for dissolving the latter. The advantages and disadvantages of distillation were likewise discussed.

The fifth paper, by C. K. Gallagher, of Washington, N. C., illustrated an apparatus used in the southern States during the civil war for the manufacture of *saltpetre* for ammunition, and one for making *alcohol* for hospital

use. The third apparatus figured shows the crude stills in use in North Carolina for the distillation of the *volatile oils* of sassafras, pennyroyal, peppermint, etc., as follows:

A trench is dug in the ground, ending in a chimney. A box with sheet-iron bottom, closed top, and auger hole to introduce water in the top, is surmounted by a barrel, which is connected (by an elbow of wood, bored out with an auger) to a tin pipe lying in a trough of cold water, which is the condenser. The outfit costs about \$10. The sassafras roots are dug, washed, bruised and chopped into short pieces and placed in the barrel. Water is introduced into the steamer or box, all the joints luted tight with clay and fire applied in the trench. The steam passes through auger holes in top of box and bottom of barrel, and is condensed and passes into the receiver with a portion of oil, which is decanted from above, or the water drawn off below.

Mr. Luhn had sent various specimens of sand, which was brought to the surface of the earth during the great earthquake in South Carolina in August 1886; these were exhibited by Mr. Painter.

Two elaborate papers on volatile oils, by Ed. Kremers, of Wisconsin, were presented, and of each a synopsis was read. *Oil of Pennyroyal* (hedeoma) was found to contain an alcohol, boiling in the neighborhood of 70° C., but as obtained from two different samples of oil, the ultimate composition and the boiling point varied to some extent. A body named *hedeomol* has the composition $C_{10}H_{18}O$, and exists in two modifications, boiling near 170° and 208° C., the former having an odor somewhat resembling lavender, while the odor of the latter is mint-like, recalling that of pennyroyal. On saponification of the oil, formic, acetic and isoheptoic acids were obtained.

Oil of Citronella (Andryopogon Nardus, *Lin.*) yielded a heptoic aldehyde $C_7H_{14}O$; a terpene $C_{10}H_{16}$; citronellol $C_{10}H_{18}O$, and acetic and valerianic acids.

Irish-moss Gelatin was the title of a paper read by Prof. Painter, and a number of samples were exhibited. A strong solution of the gelatinous principle of Irish-moss may be made by suspending the washed drug enclosed in a conical bag in a percolator containing water, and heating this by means of a water-jacket to the boiling temperature for about two hours; the thick mucilaginous liquid is then drawn off, and may be evaporated to dryness by placing it in shallow trays in a well-heated drying closet. The yield of gelatin is about 70 per cent., the Irish-moss not being completely exhausted. As an example for the manner in which it may be used for emulsions, the following is given:

Emulsion of Cod-Liver Oil. Dissolve Irish moss gelatin, 40 gr., in boiling water, 5 fluidounces, transfer the solution to a pint bottle, add cod liver oil, 8 fluidounces, in divided portions, shaking vigorously after each addition until a perfect emulsion is formed; then add syrup of tolu, 2 fluidounces, and lastly a solution of oil of sassafras 10 minims, oil of wintergreen 10 minims, and oil of bitter almond 2 minims, in alcohol 1 fluidounce; shake well together. The emulsion may also be made in a mortar in the usual way.

Pharmacist and Manufacturer was the subject discussed in a paper by Prof. Lloyd. The relations between the two are of such a nature that it is not easy to give a synopsis of the paper in a few lines. The advantages and disadvantages of each, in manipulating upon small and large quantities, were reviewed, and it was argued that the manufacturer should aim at producing preparations equal to those made by the skillful pharmacist, but that the latter should endeavor to make most, if not all, the pharmacopœial preparations. A lengthy discussion followed, in which among other things, the practice prevailing to some extent, of making tinctures from commercial fluid-extracts was criticized, and the abolishment by the pharmacopœia of fluid-extracts was advocated, the latter to be replaced by fifty-per-cent. tinctures, which would ultimately take the place of the stronger and the weaker preparations, and in their manufacture did not require the use of heat.

The Medicines of Medicine was the somewhat ambiguous title of a paper read by Prof. Painter, referring to the numerous proprietary articles prescribed by physicians, a practice which should be condemned for professional and scientific reasons; but unfortunately, a practical remedy for the evil was not suggested. A motion to publish this paper for general distribution to physicians, was tabled.

Weights and Measures, by Alfred B. Taylor. To this subject the author has given a great deal of attention, and has heretofore written several elaborate essays in relation to the various systems in use. He is an advocate of the octonary system of numeration, and presents his views in a clear and forcible manner. The paper, very naturally, elicited discussion on the decimal system and on the pharmacopœial system for stating quantities. In relation to the latter Mr. Hallberg offered a resolution from the Illinois Pharmaceutical Association, that in the next revision of the U. S. P. the parts-by-weight system be replaced by the weight-and-volume system; that the decimal proportion be retained so as to harmonize with the metric system, and that relative quantities be also expressed in corresponding Troy weight and U. S. wine measure. The resolution was referred to the Committee on the Pharmacopœia.

Three papers were presented by Joseph Feil of Cleveland, on *Ground Ointment Medicaments*, in which the recommendation is renewed to prepare ointments by the use of a paint mill; on *Bismuth and Potassium Citrate*, which is proposed to be prepared from two parts of bismuth citrate and five parts of potassium citrate, the two yielding a clear solution; and on *Solizirs*, which term is proposed for rather concentrated solutions of medicaments, which are to be converted into elixirs by the addition of simple elixir. The formulas given yield solutions in alcohol, or in water and glycerin.

The Percentage of Ethyl-nitrite in Washed Nitrous Ether, by W. Simonson, was the last paper presented. It gives a large number of assays, showing the variation in strength, if made by the same process at different times, and it is suggested that in preparing spirit of nitrous ether it be assayed to determine its strength, or that it be made from the pure ether by dilution.

A letter from Mr. J. B. Bond of Little Rock, Arkansas, was read, urging the use of measures of capacity for liquids.

A special report of the Committee on Publication, referred by Council to this section, was read. It was in reference to a proposition made the year before that papers be printed for the use of the members present. The report was in opposition to this plan, but favored the printing of a synopsis of each paper, this being regarded as sufficient to enable the listener to intelligently discuss a paper which he may have heard read. The section, however, favored the printing of the papers by the Association's printer in the type in which they are to appear in the Proceedings, and the Association subsequently ordered that arrangements be made to that effect by the Permanent Secretary.

The Section on Pharmaceutical Education was organized by the election of Professor J. F. Judge, of Cincinnati, chairman; Professor H. M. Whelpley, of St. Louis, secretary, and Professor P. W. Bedford, of New York, as the third member of the Educational Committee. No further business was transacted before the Section adjourned.

The Section on Pharmaceutical Legislation was organized by the election of Dr. R. F. Bryant, of Kansas, chairman; Wm. P. DeForest, of Brooklyn, secretary, and John M. Maisch, of Philadelphia, as the third member of the committee.

On motion of Mr. Day, a committee of five was appointed to devise a plan, if the same be feasible, for the interchange of certificates by State Boards of Pharmacy. The chair subsequently appointed Messrs Day, of Illinois; Nicot, of New York; Hatton, of Ohio; Schafer, of Iowa, and McDonald, of Michigan.

As subjects for discussion at the meeting next year Mr. Day proposed: "Should the Diplomas of Colleges of Pharmacy entitle Holders [to Registration without Examination?" and Mr. Hallberg offered "An Outline of a Pharmacy Law Embodying All Desirable Features."

The session of the Section was attended by representatives of eight State Boards and two County Boards of Pharmacy.

The *Ninth Session* of the Association convened on Friday morning, September 9th, when after routine business, the introductory to the report on the progress of pharmacy, and the report on the drug market were read. A motion that in the latter report the names of drugs be changed in accordance with pharmacopoeial nomenclature, was lost, after several speakers had expressed their preference for following commercial usage in a report pertaining to commercial matters.

A motion inviting female pharmacists to join was tabled as being unnecessary, since the Association had elected ladies as members some years ago.

A supplementary report from the Nominating Committee was received, naming three members of Council, and Mr. James Vernor, of Detroit, Local Secretary. The nominees were elected, and Mr. Vernor was also made chairman of the Committee on Arrangements.

Various telegrams and invitations were received and acknowledged. The delegates from the National Wholesale Drug Association who were present, addressed the meeting, and a committee was appointed to visit that association at its next meeting.

On motion of Mr. Seabury three prizes of \$75, \$50 and \$25, were offered for competition to the most practical papers presented next year in the Scientific Section; and on motion of Mr. Macmahon, \$50 were voted to the Committee on Commercial Interests for a prize or prizes in connection with the exhibition intended to be held next year.

On motion of Mr. Klie, copies of the Proceedings were ordered hereafter to be sent to the State Associations.

The sum of \$75 was placed to the use of the Formulary Committee for necessary expenses. The Management Committee was reappointed for the next year for presenting such recommendations as may be deemed necessary for the perfection of the recently adopted course in conducting the business at the meetings; and the Committee on Commercial Interests was instructed to confer with the National Wholesale Drug Association in regard to mutual fire insurance.

In addition to papers to be read at the annual meetings, also reports of committees and officers of the Association are to be printed, if feasible, for the use of members at the annual meetings, but no journal or other publication is to be allowed access to these documents in advance of the meeting.

The Council reported its organization as follows: W. H. Rogers, chairman; Karl Simmon, vice chairman; G. W. Kennedy, secretary; chairman of Committee on membership, G. W. Kennedy; on Finance, M. W. Alexander, and on Publication, C. L. Diehl.

Resolutions of thanks were passed, and after reading of the minutes the Association adjourned to meet next year in Detroit, at a time to be fixed by the Council.

During the sessions seventy new members joined the Association by election or as delegates, and by paying the customary fee. In addition 444 persons were, upon the recommendation of two or more members, invited to join, and they will become members by paying the dues and filing their signatures to the constitution and by-laws of the Association.

A number of members arrived in Cincinnati on Saturday and Sunday preceeding the first session, and were hospitably entertained by the local pharmacists. The entertainments projected by the Arrangement Committee, consisted of a reception and promenade concert at the Grand Hotel on Tuesday evening, and an instrumental and vocal concert at Music Hall on Wednesday evening. On Thursday evening the members enjoyed the splendor of the grand spectacular drama, "Rome under Nero," with its vast arena, chariot races, combats, processions, etc., terminating with the conflagration of the Eternal City. On Friday afternoon a large number of carriages conveyed the members to various places of interest in the beautiful suburbs of Cincinnati, this portion of the programme terminating with a visit to the Zoological Garden, where dinner was served for the entire party. The visiting ladies were most of the time taken care of by the Local Ladies' Committee, Mrs. J. D. Wells, chairman, who with her efficient associates left nothing undone to make the stay of the visitors both profitable and enjoyable. That besides the entertainments provided by the official programme of the Arrangement Committee numerous visits were made to

localities and to establishments, and that occasional impromptu meetings for social intercourse were arranged and successfully carried out, need scarcely be stated in view of the well-known generous hospitality of the citizens of Cincinnati in general, and of the Cincinnati pharmacists in particular.

MINUTES OF COLLEGE MEETING.

PHILADELPHIA, September 26th, 1887.

A stated meeting of the members of the College was held in the hall this day, Robert Shoemaker, presiding. Seventeen members present. The minute of the last stated meeting was read, and on motion adopted. The minute of the Board of Trustees for September was presented, and on motion approved. The terms of three members of the Board of Trustees expiring with this date, as also the yearly terms of the Committee on Deceased Members, it was on motion resolved to hold an election. The names of the following gentlemen (the present incumbents), were placed in nomination for Trustees to serve three years: Messrs. A. P. Brown, D. S. Jones, and Henry Trimble, and also, the following as Committee on Deceased Members. Charles Bullock, Gustavus Pile, and Wallace Proctor, (also present incumbents). There being no other nominations offered, and, therefore, no opposition, the secretary was on motion directed to cast an affirmative ballot for all the candidates, which being done they were declared duly elected to their respective positions.

The report of the delegates to the recent session of the American Pharmaceutical Association held at Cincinnati being called for, the Chairman, Henry Trimble, presented the same which was on motion accepted, and directed to be placed upon the minutes. The following are condensed prominent statements in the report:—

“The report of the Committee on Re-organization was adopted with slight modification—this report changes radically the method of business procedure, and assigns the work to four sections as follows. Commercial Interests, Scientific Papers, Pharmaceutical Education, and Legislation; each section elects its own officers. Prominent among the amendments made to the by-laws is that which admits to membership without payment of the initial fee. The newly elected officers of the Association are to be installed in future at the closing session. An exhibit of products is to be held annually under the auspices of the Association, and the Association is to become, if possible, an incorporated body. There are about 1400 active members now on the roll, seventy having been elected at the last session. Of cash on hand \$4,000 was assigned to the permanent fund. Three prizes are to be competed for annually for the best original papers: first, \$75; second, \$50; third, \$25; and a prize for the best exhibit. The meeting, is on all sides acknowledged to have been both practically, and in a professional sense a success. Much credit for personal enjoyment is accredited

to the thoughtfulness of the druggists of Cincinnati. The next meeting takes place at Detroit."

The chairman announced the recent death of James Bowker of this city, elected a member in 1872. On motion adjourned.

W. B. THOMPSON,
Secretary.

PROCEEDINGS OF STATE PHARMACEUTICAL ASSOCIATIONS.

Kentucky, p. 72.—Tenth annual meeting; see July number, p. 371. Next meeting in Henderson, May 9, 1888. E. Y. Johnson, Louisville, Corresponding Secretary.

Massachusetts, p. 196.—Sixth annual meeting; see July number, p. 371. Time and place of the next annual meeting will be decided upon at the special meeting to be held in Boston, January 10, 1888.

New Jersey, p. 157.—Seventeenth annual meeting; see July number, p. 372. The volume contains an excellent phototype portrait of the late R. W. Vandervoort, formerly president of the Association. Next meeting in Morristown, May 16, 1888. H. M. Smith, chairman of Local Committee.

Pennsylvania, p. 198.—Tenth annual meeting; see July number, p. 373. Next meeting in Titusville, June 12, 1888. Chas. D. Lippincott, Assistant Secretary.

VARIETIES.

A caution concerning the use of blisters.—J. Comby (*Progr. Méd.*) reports the case of a child, two years old, which, having been attacked with double broncho-pneumonia in the course of measles, was treated by the application of two large blisters, one of which was kept on for six hours and the other for four. A fortnight afterward, the surfaces to which they had been applied were occupied by large suppurating and gangrenous sores, and the child died three days subsequently. In the author's opinion, its death was hastened by the blisters, and he adds the general warning that blisters should be used only with the greatest caution in children, especially where from the nature of the disease there is reason to apprehend the supervention of a diphtheritic complication, and never in children's hospitals.—*N. Y. Med. Jour.*, Aug. 13.

EDITORIAL DEPARTMENT.

POISONING BY CHROMATE OF LEAD.—In the August number, page 431, we have referred to the cases of poisoning caused by the eating of buns which had been colored with chromate of lead. Professor J. J. Reese has since published in *Medical News*, August 27th, the results of the chemical examination made by himself in conjunction with Dr. H. Leffmann. The bodies of four of the victims were disinterred. Two of these had been buried about two

years; one about five months; and one a little over one month. In addition to these the liver and spleen of a child recently deceased were examined. The investigation was made by first exsiccating the parts and then carefully incinerating them, generally with the repeated addition of a small quantity of nitric acid to effect the complete destruction of the organic matter. The ash thus obtained was next dissolved in dilute nitric acid at a moderate heat, filtered, evaporated to dryness, again dissolved in distilled water and was now ready for the different tests for lead, sulphuretted hydrogen, dilute sulphuric acid, potassa, potassium hydrate, potassium bi-chromate and metallic zinc being used for the purpose. The liver and kidney, in some cases, also the brain, spinal cord and stomach, were examined and afforded decided evidence of the presence of lead, but the heart and lower jaw of one of the bodies gave no appreciable results.

Before concluding his report Professor Reese makes the following observations:

"The point of most interest in the above cases—physiologically and toxicologically considered—is probably the fact of the detection of lead after death in the two great nervous centres, the brain and spinal cord. It has been asserted by some who have experimented with this poisonous metal on the lower animals, that it has a special affinity for these organs, and that it was found after death in them in greater abundance than even in the liver. The results of our experiments upon the human subject, as above detailed, do not confirm this statement, but, on the contrary, show that the liver, as a general rule, contains more of the absorbed poison than any of the other viscera; and they point to this gland as the great eliminating organ for poisons from the human body."

TEAR BLANKET TREE AND STENOCARPINE.—During the past month or two many of the medical journals gave accounts of experiments made with a substance claimed to be an alkaloid, and to possess properties closely analogous to those of cocaine. The history of this substance is given as follows:

"During the past fall, Mr. M. Goodman, veterinary surgeon, in traveling through West Feliciana Parish, La., had occasion to apply a poultice to the fetlock of one of his horses. Having none of the customary means at hand with which to make it, he raked together a number of leaves from the ground, and having saturated them with hot water, applied the mass as a poultice to the inflamed part. After the swelling had arrived at a proper condition, he made a free incision into the part without the horse giving any evidence of pain. It occurred to him that the leaves might have anæsthetic properties; and a few weeks after, having occasion to open an inflamed bursa on the elbow of another horse, he made a similar poultice, applied it as before, and again made the incision without any pain to the animal.

"Mr. Goodman states that the tree is known in the locality mentioned as the *Tear Blanket Tree*. It grows to the height of 35 to 40 feet, with a diameter to the bole of about 18 inches, and a spread of foliage of about 30 to 35 feet. The leaves resemble those of an acacia. The bark is smooth. From the ground up, the tree is furnished with clumps of forked spines or thorns, the parent spine springing at right angles from the bough or trunk. Though Mr. Goodman is a native of the region, he has never seen the tree blossom. As fruit it bears pods 8 or 10 inches in length, flat and slightly curved, containing seeds and a viscid juice. The spines are very tough and highly polished, and the wood is extremely tough. It grows in clumps and singly, and is abundant in Louisiana.

"From the likeness of the tree to the *Acacia stenocarpa*, Dr. Seward who made a chemical examination of the leaves dubbed the new alkaloid *stencarpin*. It would have been better, however, to withhold the naming of the alkaloid until the botanical name of the tree had been known."

The criticism in the last sentence quoted is unquestionably proper. But in carefully reading these accounts, several other points assume a rather mysterious appearance. In the first place, the name "tear blanket tree" cannot be found in any of the southern floras which we have consulted, nor in the Catalogue of the Forest Trees of North America, by Prof. E. S. Sargent, or in the same author's excellent and comprehensive Report on the Forests of North America, issued as a part of the publications in connection with the tenth census of the United States. In the latter work the vernacular names have been carefully collected; the absence of the one quoted above, however, cannot be regarded as proving that it is not used in certain localities. If the leaves of the mysterious tree really possess valuable medicinal or other properties, the identification of the tree itself would seem to be an easy matter for one of the numerous botanists who are intimately acquainted with the flora of the southern and southwestern States. Instead of consulting a botanist, the tree is simply stated to resemble the *Acacia stenocarpa*. But has this tree been selected on account of its being familiar to the public or to pharmacists or to physicians? In answer to this we must state that *Acacia stenocarpa* is indigenous to Abyssinia and Nubia, where it is known as *talha*, *tatch* or *kakul*, and where a limited quantity of colored gum is collected from it. The habit of this tree is therefore not generally known, and to liken to its appearance that of an American tree is a simile of very questionable utility or propriety.

But this comparison would seem to indicate that the enigmatic tree belongs to the mimosæ, or is closely related to them. By consulting Prof. Sargent's Report it will be found that twenty-seven trees of the leguminosæ are found on North American soil, nine of which belong to the sub-order mimosæ, but do not grow wild in Louisiana, since the eastern limit of seven lies in some parts of Texas, and two belonging to the West Indian flora merely reach northward into the semi-tropical parts of Florida.

Of the ten papilionaceous trees not one is mentioned as growing in Louisiana; but two out of the eight cæsalpiniaceous trees grow in that State, namely, *Cercis canadensis*, *Lin.*, the well known *red bud* or *Judas tree*, and *Gleditschia monosperma*, *Walter*, known in the southern States as *water-locust*, and occasionally as *water-honey-locust*. Only the latter is thorny, and in this respect resembles the above named acacia. The water-locust grows from South Carolina to Matanzas Inlet and Tampa Bay, Florida, through the Gulf States to the valley of the Brazos River, Texas, and through Arkansas to Middle Kentucky and Tennessee, Southern Indiana and Illinois. The "Report on the Forests" gives the following particulars:

"A tree 12 to 18 meters in height, with a trunk sometimes 0.60 or, exceptionally, 0.90 meter in diameter; deep swamps; rare in the South Atlantic and Gulf States; common and reaching its greatest development in the bottom lands of southern Arkansas, Louisiana, and eastern Texas, here

often covering extensive areas. Wood heavy, very hard, strong, rather coarse-grained, compact, susceptible of a high polish; layers of annual growth clearly marked by one to three rows of open ducts; medullary rays thin, conspicuous; color, rich bright brown, tinged with red, the thick, heavier sap-wood clear light yellow; specific gravity, 0.7342; ash, 0.73."

It may, perhaps, be objected that we have devoted more space to this subject than its importance deserves; but the mystery which has been unnecessarily thrown around it, is akin to mystification. At any rate, it must be acknowledged that the plant could have been readily identified, before anything with scientific pretense was published, and that the term *stenocarpine* has not the shadow of a right to be applied to a substance claimed to have been isolated from an American tree which *seems* to be the waterlocust of our Southern States.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Pennsylvania Poison Register.—Prepared in accordance with the late Pharmacy Bill, regulating Sale of Poisons. Lebanon, Pa., 1887. Fred. W. Frost. Price \$1.50.

This is a blank book for the registration of the sales of poisons. It is well bound, and is made of heavy ledger paper, the leaves being 8x10½ inches, neatly ruled, and with printed headings for the different columns, to facilitate full compliance with the requirements of the law. The first page contains a reprint of Section 10 of the Pharmacy law, which relates to the sale of poisons; and this is followed by a list of poisons which should be registered in conformity with the law, namely, those "which are known to be destructive to adult human life in quantities of five grains or less." Only a few of this class are popularly known and to some extent employed, mostly for the destruction of vermin, such as arsenic, corrosive sublimate, nux vomica and strychnine; or for medicinal or technical purposes, like croton oil, potassium cyanide, and mercuric oxide; the largest number of such poisons are found among the alkaloids, which are pretty fully enumerated; atropine, however, being omitted, while daturine, duboisine and hyoscyamine are mentioned, together with a number of others.

The *Register* can be recommended, because it is useful, conveniently arranged, and offered at a low price considering the quality of the work.

Hand-buch der praktischen Pharmacie für Apotheker, Drogisten, Ärzte und Medicinal-Beamte. Bearbeitet von Dr. H. Beckurts und Dr. Bruno Hirsch. Stuttgart: Ferdinand Enke, 1887. 3-5 Lieferung.

Hand-book of practical pharmacy for apothecaries, druggists, physicians and medical officers. Fascicles 3 to 5. Price 2 marks each.

Referring to our notice of this excellent work, on page 378, in our July number, it remains now to state that the chapters on operations and apparatus are brought to a close in fascicle 3 by a very lucid account of polarization and description of apparatus employed for this purpose. Part I closes with a chapter on pharmaceutical book-keeping.

Part II treats of the medicaments and other commodities kept in phar-

macies, and arranged in alphabetical order, with accounts of their origin, mode of preparation, recognition and examination. The nomenclature is adapted in analogy with that of the German pharmacopœia. Not less than eighteen different pharmacopœias, including that of the United States, have been consulted, and of several two or three different editions have been used. Articles which have not been admitted into any one of the pharmacopœias, but which are, to some extent, medicinally employed, including the new remedies, are considered more or less extensively in accordance with their character and importance. The fascicles before us describe in the manner indicated 281 drugs and preparations, the list opening with absinthium (absinthiin), and the last one being butyl-chloralum hydratum (butylchloral, formerly called crotonchloral hydrate). In cases where different formulas are authorized in the several countries for a preparation, the composition is shown in a tabular manner, thus bringing to prominent notice not only the difference in the ingredients used, but likewise the variations in the proportion of the same. This portion of the work, therefore, promises to become a kind of universal pharmacopœia, through the critical compilation of pharmacopœial and other drugs and preparations used in more than a dozen countries of Europe and in the United States. A number of the articles having been carefully examined, we found them as was expected, to be correct and complete for all practical purposes of the apothecary and druggist.

OBITUARY.

Stanislas Martin died in Paris last June aged 81 years. He was born at Issoudun, August 8th, 1806, became an apprentice in pharmacy in 1822, and went to Paris in 1837, where he subsequently established himself and was engaged in business until some years ago. For a number of years he was president of the Paris Société de Pharmacie, and in former years contributed many practical papers to various journals, several of which were translated and published in the AMERICAN JOURNAL OF PHARMACY. The deceased was an honorary member of the American Pharmaceutical Association.

Stanislas Limousin died in Paris after a lingering illness, April 9th, last. He was born in Ardentes, and became an apprentice in Paris in the store of Mr. Gobley. For about twenty years he was established in business. He contributed numerous papers on various subjects to different journals, and originated a number of improvements in apparatus, utensils and in the administration of medicines, among the latter the wafer capsules (*cachets de pain*).

Ernest William Reinecke, Ph. G., class 1870 of the Philadelphia College of Pharmacy, died in Pittsburg, June 1st, of typhoid fever. The deceased was a studious pharmacist and had succeeded in building up a prosperous business in his native city.

THE AMERICAN JOURNAL OF PHARMACY.

NOVEMBER, 1887.

ON THE EXISTENCE OF CANE SUGAR IN CIMICIFUGA.

A contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

Read before the Pharmaceutical Meeting, October 18,

BY C. S. GALLAHER.

During the latter part of the past summer I observed crystals, deposited in a pint bottle of fluid extract of cimicifuga, which were clear, monoclinic prisms, and possessed a sweet taste. The fluid extract was made about one year ago, by the U. S. P. process, from the drug of my own powdering; it is impossible, therefore, that the crystals could have come from anything but the cimicifuga.

On looking over the history of the drug, I found that the crystals, which resembled cane sugar, have not been previously observed, although sugar is incidentally mentioned more than once; so to satisfy my own curiosity, and thinking it might be a subject of interest to the pharmaceutical profession, I brought them with me to the chemical laboratory for identification and further examination.

The following tests were applied:

1. A few of the crystals, after washing with alcohol, were heated with Fehling's solution, but no precipitate occurred.

2. To another portion, after similarly washing with alcohol, hydrochloric acid was added, the mixture boiled, neutralized, and Fehling's solution added; an immediate precipitate of Cu_2O formed.

3. On fusing some of the crystals on platinum foil, the characteristic odor of caramel was developed.

4. By adding concentrated sulphuric acid to a saturated aqueous solution of the crystals, an immediate blackening occurred, and the mixture thickened.

The results of these tests with the physical properties convinced me that the crystals were cane sugar, which might easily have dissolved in the first portion of the menstruum, on account of the moisture in the drug.

This occurrence of cane sugar is of interest because of the varied results gotten by different investigators of this drug, a full history of which is found in Lloyd's "Drugs and Medicines of North America."

In 1861, Mr. G. H. Davis obtained sugar of the uncrystallizable variety. In 1871, Mr. T. E. Conard obtained crystals by a process which, unless very accurately worked, might give crystals of cane sugar, and his product in many ways resembled it. Of the other investigators, some have found crystals and some have not, and J. U. and C. G. Lloyd dismiss the subject, after carefully weighing all the evidence, including the respective reports of Prof. Warder and Prof. Coblenz, with the statement, "We are convinced that *cimicifuga* does not contain a crystalline proximate principle."

It appears very probable that they by greater care excluded the possibility of cane sugar being present, instead of an active crystalline principle, while the earlier investigators, not taking the same precautions, found crystals and mistook them for a new compound.

While this contribution does not say the crystals found by those who have previously analyzed the drug were cane sugar, it is offered as a suggestion that there is a strong probability such was the case, and that it may serve as a guide to those who in future undertake to further investigate the subject.

ANALYSIS OF A CURE FOR CANCER.

BY FRANK H. MOERK, PH. G.

Read at the Pharmaceutical Meeting, October 18.

Professor Maisch some days ago handed to me a small package of a powder, stating that he wished I would examine it, as it was said, or, more correctly, known to be a specific for cancer. The information furnished with the sample was, that it was supposed to consist largely of "horse-sorrel." Professor Maisch suggested that it might contain arsenic.

The powder was black in color, but white particles were easily discernible in it.

On treating a portion with warm water, a colorless solution was ob-

tained after filtration, thus indicating the absence of plants or parts of plants. This solution on evaporation and heating failed to char; another indication of the absence of vegetable matter. However, on testing for arsenic, by addition of hydrochloric acid and hydrogen sulphide, a copious yellow precipitate was obtained. The yellow precipitate of arsenite of silver was gotten by the use of an aqueous solution of the powder and silver nitrate with a small quantity of ammonium hydrate.

Insoluble in water and dilute hydrochloric acid was a black powder, now entirely free from white particles, having the appearance and properties of charcoal; on ignition this left only a trace of ash.

Another experiment was made to prove the presence of both carbon and arsenious oxide; this was to introduce a small quantity of the sample into a small bulb-tube, and heating, a metallic mirror and a ring of small crystals formed beyond the part heated.

The sample was now examined quantitatively as follows:

A weighed quantity was dried at 100° C. Loss due to moisture, 0.99 per cent. The residue was digested with three consecutive portions of hydrochloric acid, filtered through a weighed filter and thoroughly washed into a tared beaker. The insoluble portion on the filter consisted of a purified charcoal amounting to 26.07 per cent.

The solution in the beaker was evaporated to dryness, in doing so the arsenious oxide was volatilized, possibly as arsenious chloride. The residue, which was free from arsenic, equaled 10.75 per cent., of which 6.40 per cent. was extractive and 4.35 was ash. The amount of arsenic was taken by difference.

The result of the analysis is that the powder contains

Moisture.....	0.99
Charcoal.....	26.07
Carbon.....	26.07
Extractive.....	6.40
Ash.....	4.35
<hr/>	
Arsenious oxide.....	62.19
<hr/>	
	100.00

In a number of books examined, I found no mention of charcoal containing or yielding organic matter to solvents, so I thought it of sufficient interest to examine this point. Some willow charcoal was exhausted with dilute hydrochloric acid, and, on evaporation was ob-

tained a residue of a brown color, agreeing with the one gotten in the above analysis. This residue amounted to several per cent., and on ignition yielded a white ash.

REMARKS BY THE EDITOR.—Years ago we had heard of this cancer cure, but did not succeed in obtaining the powder, until Dr. Pursell placed a small quantity in our hands. The quantitative results obtained by Mr. Moerk's analysis, render it probable that the powder is made by mixing two parts of arsenious acid with one part of wood charcoal, and that the deviation from this proportion is simply the result of the difference in the specific gravity of the two ingredients favoring a partial separation of the heavy arsenic. This proportion gives arsenic far in excess of that contained in the arsenical powders of Swediaur, Cosme, Dupuytren, Pluckett and others. The letter of Dr. Pursell from which we quote below, gives some particulars which are of general interest.

BRISTOL, PA., OCT. 8th, 1887.

The history of this powder is interesting inasmuch as it has undoubtedly cured many cases of epitheliome and other cancerous growths, and now has great reputation in the upper part of New Jersey and eastern Pennsylvania. I am informed that considerable amounts of money have been offered for the secret of its composition but constantly declined. The first case of which I have direct knowledge of its use was in a man over sixty, who had a rapidly growing epitheliome on the lower lip. I had attended the funeral of his brother, who had died from a precisely similar ailment, a few years before, and had but little doubt the result of this would be the same. It, however, was effectually and permanently cured by the application of this powder, the man dying some years later of another disease. It may be interesting to know that he was a great smoker of a short clay pipe.

A more prominent case is referred to and illustrated in Prof. Gross' Surgery, sixth edition, second volume, page 138. I am very well acquainted with this man, and his disease and treatment. Prof. Gross states he diagnosed the ailment epitheliome; he operated upon it and it returned when (that is before he published the sixth edition), he lost sight of the case. Subsequently, however, this man returned to Prof. Gross, who again removed the growth by the knife, and this time scared the surface with the actual cautery. I saw the patient frequently and the healing process was never completely established. In

a few weeks it became evident the sore was enlarging and getting worse. The powder was applied for about a month, a large eschar separated, healing was induced by emollient applications, the cure was complete and he remains well to this day, although fully five years have elapsed. I could cite a number of other cases, four that I now recall, here in Bristol. I have not known of any case in which the powder has been applied where there has not been a cure; of course, there may be mistakes in diagnosis, but Dr. Gross will hardly be charged with making one.

The mode of application has been to lightly cover the surface with the powder; apply over it, to protect the powder and keep it in place, a piece of *black* silk, somewhat larger than the ulcer and made adhesive by egg albumen. Considerable pain is, of course, produced; but the first application, and all subsequent ones, is allowed to remain until the pain leaves, which will be in five or six days. A new one is then applied in the same way and repeated from time to time until an eschar is detached without force. A poultice of elm bark is applied and the ulcer allowed to heal. It may be the charcoal found by analysis is from *sheep sorrel*, as the person using it was known to collect that plant on different occasions. While the use of arsenious acid for external application has long been made, yet every writer emphasizes the danger in using it where the cuticle is removed, and I imagine most physicians like myself have feared to so use it.

H. PURSELL, M.D.

LINIMENTUM AMMONIÆ AND OTHER LINIMENTS.

BY JOSEPH W. ENGLAND, PH.G.

Read at the Pharmaceutical Meeting, October 18.

It goes almost without saying, that the most popular and generally employed stimulating and rubefacient liniment, both amongst the laity and the profession, is the official "*Linimentum Ammoniacæ*," or the so-called ammonia or volatile liniment. In many respects, the U. S. P. (1870) formula for its making with its two-thirds volume of olive oil and one-third volume of ammonia water, possessed decided advantages over the very questionable improvements, in the substituting of cotton-seed oil for olive oil, and the decrement in amount of ammonia water, adopted by the last pharmacopœial committee of 1880.

In the first place, as has been shown before, it is impossible to

perfectly emulsify cotton-seed oil by simple agitation with ammonia water, nor for that matter olive oil either; but the latter yields the far better product, although occasionally gelatinizing on standing. Numerous other fixed oils, as the fatty base, have been suggested, such as almond, benne, peanut, sunflower-seed, etc., etc., and, notably, lard oil, by Prof. Remington, at the last meeting of the Pennsylvania Pharmaceutical Association. This last fatty liquid, in its pure state, certainly furnishes a most superior product, but the writer has had difficulty in obtaining a pure commercial lard oil, of unvarying chemical composition, and to this fact is due the excellent qualities of some of the lard oil liniments, and the partial saponification and very quick separation of many others.¹ Again, it is more than suspected that certain commercial makes of lard, and if lard then lard oil, contain cotton-seed oil. The application of "Bechi's test," for detecting the presence of cotton-seed oil in lard oil, is of no value, since lard oil is the only fixed oil known to the writer that reduces that test the same as cotton-seed oil. The best test would probably be the "Elaidin test," or, possibly, its solubility in absolute alcohol which the writer found to be about ten times its weight in the cold-pressed product; but if that same product be previously heated its solubility was diminished.

The following editorial in the *Philadelphia Times*, for September 23, may be of interest as showing the extent of asserted adulteration in this commodity :

"Philip D. Armour, of Chicago, recently made the assertion, when trying to obtain oil at low rates from the Cottonseed Oil Trust, that he consumed in his lard factory one-fifth of the entire cotton-oil product of the United States, or 3,500,000 gallons annually. Mr. Armour sells only pure lard, if his brands are to be credited. The public is thus left to choose which it will believe—that Mr. Armour was lying when he boasted of the use of 3,500,000 gallons of cotton-seed oil, or that the labels on his packages of so-called pure lard are all lies.

"Assuming that Mr. Armour's statement as to the amount of cotton-seed oil used annually at his lard factories is true, the revelation involved as to the ingredients constituting the pure lard of commerce is not without importance. Such methods of business furnish the only justification for legislative interference in the manufacture and sale of butter, cheese, lard, and other articles of daily consumption. The public is entitled to protection against the sale of

¹ Prof. Remington, in his "Practice of Pharmacy" (p. 866), says, concerning the commercial character of lard oil, that "as found in commerce it is almost invariably adulterated with paraffin oil. As it is largely employed in lubricating, this admixture is not particularly injurious, but for its principal use in pharmacy as the base of citrine ointment, the presence of the paraffin oil prevents solidification."

one article in the place of another—cotton oil for lard, oleomargarin for butter, glucose for sugar. If the sense of honor of men like Armour is not keen enough to prevent them from perpetrating a fraud of this kind legislation is not without excuse.

"Massachusetts has already passed a law, which goes into effect October 1, compelling all adulterated food products to be sold for just what they are. The act is designed as a protection both to consumers and to honest dealers. If lard mixed with cotton oil can be sold for pure lard, then pure lard becomes an impossibility for the reason that no manufacturer of pure lard can compete in prices with those who manufacture the adulterated article. The same holds true of any article that can be successfully adulterated beyond the power of the ordinary consumer to detect. But what a revelation Mr. Armour's frank admission of his extensive use of adulterants furnishes of the low standard of business honor prevalent among the men who have piled up fortunes in the manufacture of articles of such common consumption as lard, sugar, butter and cheese."

Again, an error has doubtless been made (though small in amount), in reducing the quantity of ammonia water to 30 per cent. The general idea of the profession in using ammonia liniment is not so much to have a nearly neutral saponaceous mixture, but one which will possess, in addition to those emollient features the sharply stimulating qualities arising from an excess of ammonia. Indeed, some physicians go so far, when wishing strongly stimulating effects, as to make their volatile liniment contain one-half strong ammonia water (F. F. F., sp. gr. .933).

The statement has been made that perfect saponification is largely dependent upon the closeness in specific gravities to each other, of the two liquids used. Nothing seems more in error. Olive oil, with a specific gravity ranging between .915 and .918, makes an infinitely better mixture with solutions of alkaline hydrates in general, and ammonia water (sp. gr. .933) in particular, than cotton-seed oil with its specific gravity of from .920 to .930; and oil of lard (sp. gr. .900 to .920) yields a very much better product than cotton-seed oil; whilst, on the other hand, linseed oil (sp. gr. .936) yields most readily to saponifying influences. So readiness of saponification cannot depend so much upon the specific gravities of the two admixed liquids as it does upon the chemical characters of those constituents, other than that trio of fatty proximate principles—olein, palmitin and stearin, *i. e.*, gum, albuminoids, color, extractive, etc.

Some months ago, while making the so-called *carron oil*, according to the older formula, and noticing the immediate and complete saponification which takes place between the unboiled linseed oil and the solution of lime, that relatively weak alkaline hydrate, the idea sug-

gested itself that an equally good, if not better, ammonia liniment than the usual one, could be had by using ammonia water in place of lime water. Experience, in this case, has sustained theory, and the results yielded are very satisfactory; saponification ensues immediately on simple agitation of the two liquids, but care must be exercised in the selection of the oil, and only the unboiled, officinal, cold-pressed oil should be used, otherwise, the result is a failure since the boiled oil yields a most unsaponifiable preparation.

The U. S. P., 1880, states cold-pressed linseed oil to be soluble in five parts of absolute alcohol. The writer has examined quite a number of commercial makes, and one personally made from flaxseed meal and carbon bisulphide; but in no instance was he able to obtain an oil soluble in less than ten times its weight of Squibb's absolute (99.8 per cent.) alcohol, and when the home-made product was heated its solubility was diminished over 50 per cent. Several dealers have stated that a cold-pressed linseed oil of undoubted purity is readily obtainable in the markets.

The following is the formula used:

Take of

Ammonia water (F. F. F. ¹).....	2 f. oz.
Lin-seed oil (U. S. P., '80).....	4 f. oz.

Place the oil in a bottle, add the ammonia water in portions at a time, agitating thoroughly after each addition.

The product formed is a cream-like saponaceous liquid, possessing all the stimulating and rubefacient qualities of those made by the older formulæ, and unlike them does not cake on standing. It acquires, however, on standing a month or two, a yellowish tinge, but its properties remain unaffected. Rubbed on the surface of the body it warmly stimulates, and is quickly absorbed by the skin.

The readiness of cold-pressed, unboiled linseed oil to saponify, even when added to other fixed oils, was also curiously illustrated to me a short time ago. Having some four or five pints of volatile liniment on hand, made by the present pharmacopœial formula with cotton-seed oil, which had separated into several layers, about four fluid-ounces of linseed oil was added to the unsightly mixture and the bottle thoroughly agitated, with the result of complete saponification of all the cotton-seed oil, as well as the added linseed oil. Up to the

¹ The commercial F. F. F., or 20° B., ammonia water, contains 17.5 per cent. NH₃ gas.; spec. grav. .933.

present time, which is about two months, a sample of the mixture has remained permanent and shows no sign of separation.

Apropos of the subject of liniments, a change, or, more correctly, a return to the older method in the officinal formula for the *linimentum calcis*, of our present pharmacopœia, is most strongly urged by the writer. As is well known, this emollient and protective emulsionized liquid, used almost wholly for applications to recent and superficial burns, especially in the ulcerative stage, where it acts not only as a protective, but also as an astringent, is directed to be prepared with equal parts of cotton-seed oil and lime water. Now, the same objections, previously mentioned, which apply to cotton-seed oil in the case of *linimentum ammoniacæ* apply in a much greater degree to the use of that fixed oil in this instance; especially when we consider the relatively small quantity of calcium hydrate contained in lime water. The old formula for "carron oil," with its one-half linseed oil and one-half lime water, each by volume, is thoroughly recognized and used everywhere, in lieu of the present pharmacopœial product, and the use of that preparation—if indeed it ever obtained a foothold in the profession, which is questioned—has certainly fallen into a state of "innocuous desuetude" and the query naturally suggests itself, Would it not be better for our officinal standard to recognize this time-worn and time-tried formula, whose usage runs the world wide, in place of this inefficient substitute which fails to fulfill its intended object?

Without question, one of the best turpentine liniments of the day is that milk-white liquid, *St. John Long's Liniment*. It has achieved deserved popularity, and when carefully made nothing can be said against it; but there is one feature, in connection with its making, that greatly interferes with its more general employment, and that is the difficulty, at times, of obtaining good eggs, and then, when obtained, of perfectly suspending the very large percentage of oil of turpentine. To obviate this trouble the writer has devised a modified formula, without the use of eggs or acetic acid. Owing to the presence of the excess of stimulating ammonia gas, the volatile oil has been slightly reduced in quantity from the original formula.

Take of

Ammonia water (F. F. F.).....	1½ f. oz.
Oil of linseed (U. S. P., '80).....	2½ f. oz.
Oil of turpentine q. s. ad.....	6 f. oz.
Oil of lemon.....	30 minims.

Mix thoroughly in a bottle the linseed oil, with the ammonia water gradually added. Then add, in small portions at a time, the oil of turpentine, shaking after each addition, and then, lastly, the oil of lemon.

The product is a milk-white, thoroughly emulsioned fluid, which separates on standing only after two or more weeks, but can be readily re-united and used after agitation, and compares favorably with that made by the original formula in every way, except that of perfect suspension. It possesses the additional advantage that it can be readily and quickly made, and contains, besides the turpentine, a slight excess of ammonia water, which increases its stimulating qualities.

If this latter feature is not deemed desirable, the liniment can be secured with carron oil (made with lime water), four fluidounces, and oil of turpentine, two fluidounces, using the same general directions as above. When first made the product is a beautiful one, but on standing for a day or two, separation quickly ensues. This need not, however, be taken into account, since after fresh agitation, the liquid remains suspended sufficiently long to use.

One feature of these "soap-liniments," which certainly retards or prevents excessive stimulation and one which seems to have been generally overlooked, is the presence of glycerin, arising from the decomposition of the fatty glycerides in the fixed oil. The presence of this alcohol must have some modifying influence in their application, more particularly of carron oil in promoting the restoration of injured tissues to their normal healthy condition, whilst it seems very reasonable, in the other cases, to assume that excessive stimulation is modified.

In conclusion, the writer would say, that he has found it far more satisfactory in his experience, to make up all these liniments extemporaneously, as they may be called for, in view of the fact that the soap present is not in solution but merely in suspension, and they are most apt in time, no matter what fatty base is used, to cake or solidify on prolonged standing, or separate partially perhaps from some loss of water by evaporation, but largely from deposition of the suspended, undissolved soap. Further oxidation and change of composition ensues, sooner or later, if they are kept in open vessels. Hence, extemporaneous preparation is to be preferred.

PRACTICAL NOTES FROM VARIOUS SOURCES.

BY THE EDITOR.

Spirit of ether is a powerful stimulant of secretion, and is recommended by Dr. Auld (*Lancet*) for preventing the disagreeable after-effects of opium; he generally prescribes equal parts of spirit of ether and tincture of opium.

Antidiabetic pastilles, containing saccharin, are prescribed by Dr. Fischer (*D. Med. Wochenschrift*, Sept. 1887) as follows: Saccharin, 3.0; exsiccated sodium carbonate, 2.0; mannit, 50.0 gm. These quantities are for 100 pastilles, one of which is used for sweetening a cup of coffee, tea or cacao.

Naphthalin pills are covered by Bernbeck (*D. Mediz. Zeitung*, May 1887) with elastic collodion in preference to keratin. A good formula for the pills is: Naphthalin, resublimed, 10.0; powdered althæa, 5.0 gm., and sufficient mucilage to make 100 pills. The pills require to be dried for several days, until they crumble under pressure of the fingers, without flattening, when they may be coated with collodion, which will dissolve only in the lower bowels.

Nutrient enemata are recommended by Dr. Ewald (*Therap. Monatshefte*) to be prepared by mixing three or four eggs with four or five ounces of a solution containing from 15 to 20 per cent. of glucose. Mucilage of gum or of starch may be added, and, if required, a few drops of tincture of opium. Such an enema should be given only after the bowels have been well emptied, for which purpose an injection of luke-warm water or solution of table salt may be used.

Another form of enema is made by beating together two or three eggs with a tablespoonful of cold water and a little starch, adding a teacupful of 20 per cent. solution of glucose, heating the mixture gently, so as not to coagulate the albumen, and stirring in a wineglassful of red wine. Peptones may likewise be used in addition to, or for replacing the eggs. An enema of eight or nine ounces is preferably given in two or three doses.

Suppositoria peptoni have been used by Dr. Sauter. They contain 1.6 gm. (gr. xxv.) of peptone and sufficient cacao butter. They require to be kept in a cool place to prevent rancidity. Adults use two suppositories three or four times a day, an enema being previously used.

Huchard's aperitive tincture.—Tinct. rhei, 10 gm.; tinct. nucis

vomicæ, 6 gm.; tinct. illicii anis., 4 gm.; mix. Take ten drops in half a glass of water about ten minutes before each meal.

A disinfectant and deodorizing powder for old excavated ulcers is recommended by Barbocci to be prepared from equal parts of animal charcoal and powdered camphor.

Unguentum acidi borici.—Melt together yellow wax one part and benzoated lard six parts, and rub together with boric acid one part, previously triturated into an impalpable powder with a few drops of alcohol.—*Can. Pract.*

Antiseptic powder.—Lucas-Championnière (*L'Union Méd.*) uses for wounds an intimate mixture of equal parts of iodoform, cinchona, benzoïn and magnesium carbonate, each article to be finely powdered and sifted; oil of eucalyptus is added to the mixture.

Corrosive sublimate paper is prepared by saturating filtering paper with a solution containing 2 per cent. of mercuric chloride and 5 per cent. of glycerin, and drying. This paper is used in layers of two to eight as an antiseptic dressing for wounds.

Non-irritating antiseptic solution.—Prof. R. Lépine uses the following liquid for washing wounds, the powerful antiseptic action being due to a number of compounds, of which each is present only in very small quantity: Corrosive sublimate, 1 milligm.; phenol, 0.10; salicylic acid, 0.10; benzoic acid, 0.05; chlorinated lime, 0.05; bromine, 0.01; acid bromhydrate of quinine, 0.20; and water, 100 gm. *Prat. méd.*, June 14, 1887.

Preparation of aseptic sponges.—The following is an outline of the process recommended in *Vereinsblatt pfälzischer Aerzte*. Select sponges with medium sized pores; dry them well by heat; remove sand by beating; wash upon a sieve until perfectly clean; immerse for two hours in solution of potassium permanganate (1 : 1000), mixed with hydrochloric acid; wash repeatedly with water until free from acid reaction; immerse for twelve hours in solution of corrosive sublimate (1 : 1000); wash repeatedly with distilled water; dry in a room free from dust, and preserve the sponges in tightly closed vessels.

Salol preparations.—A. Nicot gives (*Bull. gén. de Thér.*, Sept. 15, 1887, p. 219) a number of formulas for the internal and external use of salol, from which the following are selected:

Tablets of salol.—Tragacanth, 1; gum arabic, 3; water, 10; salol, 25; and sugar, 60 gm.; mix, add oil of lemon, 5 drops, and divide into 100 tablets.

Collodion of salol.—Dissolve salol, 4 gm. in ether, 4 gm., and add elastic collodion, 30 gm. Used for chapped skin.

Liniment of salol.—Olive oil, 60; salol, 10; lime-water, 60 gm. Used as an application for burns.

Suppositories of salol.—Cacao butter, 40; white wax, 3·5; salol, 10 gm.; for 10 suppositories.

Dentifrice elixir; salol mouth-wash.—Salol, 3; alcohol, 150; oil of star anise, 0·5; oil of geranium, 0·5; oil of peppermint, 1·0 gm.

Jelly of spogel seed.—One part of the seeds of *Plantago Ispaghula, Roxb.*, yields with 20 parts of water a tasteless jelly, which is preferable to the jelly of quince seed, and is particularly useful in diarrhœas. The entire seeds are also given internally; they swell considerably from the absorption of moisture, and in the large intestines give off a quantity of thick mucilage.—*Jour. de Méd. de Paris*, Sept. 4, p. 329.

Linimentum mentholi.—Menthol, 5 parts; olive oil, 45 parts; and lime-water, 50 parts.—*Rundschau, Prag*.

Tinctura saponis viridis.—Dr. Unna uses this formula: green soap, 100; strong alcohol, 50; and oil of lavender, 0·2 parts. This forms a convenient vehicle for the external application of chloroform, oil of turpentine, tar, benzol and ether, of which equal parts may be dissolved in the solution. At the temperature of the body the tincture will dissolve 40 per cent. of carbon bisulphide.

Oil of sassafras is stated by C. E. Dodsley (*Brit. and Col. Drug.*) to completely mask the odor of *iodoform*, for one ounce of the latter only four drops of the oil being required.

Detection of nitrobenzol in oil of bitter almonds.—2 cc. of the suspected oil are well shaken with 34 cc. of 45 per cent. alcohol. Pure oil of bitter almond will dissolve completely; but nitrobenzol or mirbane oil will gradually subside from the liquid in the course of twenty-four hours.

Caustic Paste of Jules Felix.—Mix in a mortar the following substances in powder: Starch, 37 parts; wheat flour, 112 parts; bichloride of mercury, 1 part; dry chloride of zinc, 110 parts; iodol pure, 10 parts; croton chloral, 10 parts; monobromated camphor, 10 parts; crystallized carbolic acid, 10 parts. Then add gradually a sufficient quantity of distilled water to form a homogeneous paste without lumps of the consistence of putty. This paste will keep an indefinite length of time.—*Lancet*, August 6, 1887.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the AMERICAN JOURNAL OF PHARMACY.

THE SUGAR TREE, or *mahwa*, of Hindostan, *Bassia latifolia*, Roxb., was stated some months since by the scientific press to be capable of producing 200 kilos of sugar annually. Recent analyses, however, show it to possess an insignificant quantity of sugar. The results give: honey, 42.03; cane sugar, 1.04; ash, 2.32; cellulose, etc., 42.20; water, 12.41=100. Such sugar can be used only for making alcohol, and the Hindoos use the flowers for that purpose. (See analysis by Prof. Church in AM. JOUR. PHAR., 1886, p. 250).

TERPIN is so often prescribed (M. Vigier, *Arch. de Pharm.*, Oct. 5), in doses of 1 to 2 gm. *per diem*, that he thinks the elixir of Garus, of which a tablespoonful will dissolve but 25 cgm., should be replaced by one of the following preparations: terpin, 50 cgm.; alcohol 95 per cent., 2 gm.; glycerin of 30° B., 4 gm. This keeps indefinitely, its amount of alcohol is small, and its doses divide nicely into teaspoonfuls. An elixir containing 50 cgm. of terpin to the tablespoonful may be made as follows: terpin, 50 cgm.; glycerin, 7 gm.; alcohol 95 per cent., 7 gm.; honey, 7 gm.; vanillin, 2 mgm. Honey is preferable to simple syrup, because it does not form crystals, and the vanillin gives the preparation an agreeable flavor.

THE STINGS OF INSECTS may be properly treated by the intelligent pharmacist without laying him open to the imputation of being "a counter prescriber." Dr. Tillot, (*Jour. de méd et de chir. prat.*, Sept.) proposes that these painful lesions, whether caused by bees, wasps, gnats, ants, or other insects, be treated with a strong solution of cocaine applied on cotton held in place with a bandage. The pain ceases at once, and there is no tumefaction. M. Tillot reports success in "a large number of cases."

SUPPOSITORIES are easily and quickly made by a process proposed by M. Leboutte in the *Jour. de Phar. et de Chim.* for September. The cacao butter in thin slices is bruised in a mortar with the medicaments, to which are added a small quantity of medicinal soap and a few drops of water. The mass readily becomes homogeneous, and the suppositories retain the necessary consistency.

ANTROPHORES DE FRANCKE.—The various compositions used in this species of medicated bougie, which has the excellent qualities of suppleness and elasticity, united to the rigidity necessary for use in tortuous canals and fistulas, are thus given in the *Jour. de Phar. d' Als.*

Lorr. One contains 4 per cent. of boric acid; one has 2 per cent. sulphate of copper; one, 5 per cent. of sulphate of thalline; one, 5 per cent. of sulphate of zinc; three have, respectively, 30, 5 and 2 per cent. of iodoform, and others contain from 2 to 5 per cent. of hydrochlorate of cocaine. The base is formed of a mixture of gelatin and glycerin. The medicated mass is supported by a wire spiral in its centre, the coils of which lie closely together; the composition is massed around this spiral, to which it readily adheres until dissolved in the passages into which it has been introduced. The bougies are made of 7, 10 and 14 cm. in length, and those for catarrh of the prostate are 22 cm. Bougies for the latter purpose are covered only to the extent of 2 cm. The mass used for this purpose contains 2 per cent. nitrate of silver and 5 to 10 per cent. cocaine. Cocaine antrophores are used to deaden the pain likely to be felt from explorations of the urethra. Those of sulphate of zinc, thalline or resorcin are used for blenorragia. For catarrh of the cervico-uterine canal the bougies of 2 per cent. nitrate of silver or 30 per cent. of iodoform are found excellent. Fistulæ and urethral chancres are best treated with the 30 per cent. iodoform, or 3 per cent. phenic acid antrophores.

ACETO-PHOSPHATE OF COPPER IN TUBERCULOSIS.—The sulphate of copper, long employed in this disease, fell into disuse on account of the gastric troubles caused by it. Dr. Luton (*Rev. de clin. et de therap.*, September 8), wishing to make use of copper in this affection on account of its parasitocidal properties, first tried the phosphate, but this being insoluble, he now administers, concurrently, the acetate of copper and the phosphate of sodium. The double decomposition augments, so he believes, the activity of the medicament. He gives pills, potions and hypodermic solutions. For pills he uses neutral acetate of copper, 1 cgm.; crystallized phosphate of sodium, 5 cgm.; liquorice and glycerin q. s.—the latter to prevent hardening. The salts must be dried and mixed before making the pilular mass, an addition of water being indispensable to the reaction. Or, a small pill of acetate of copper may be made, and afterwards rolled in pulv. phosphate of sodium. The potion contains: of the cupric acetate, 5 cgm.; phosphate of sodium, 50 cgm.; mucilage, 125 gm. Or, each of the chemicals may be made with one-half of the menstruum and given separately at the same time, thus permitting the reaction to take place in the stomach. For hypodermic injections the mixture is: phosphate of copper (recently precipitated), 1 gm., and pure glycerin with dis-

tilled water, 5 gm. According to the writer, the copper in these mixtures plays the part of a "specific," whilst the phosphorus is a "dynamizing agent."

BICHROMATE OF ANILINE, according to Girard and L'Hôte, (*Arch. de Pharm.*, October 5), may be produced in well-defined crystals, as follows: Two saturated solutions are prepared, one of hydrochlorate of aniline, and one of bichromate of potassium, sodium, ammonium or calcium. The solutions, in equal volumes, should be mixed while very cold. Very numerous yellow crystals are thus formed which are then freed with water from all traces of alkaline chloride, and dried *in vacuo*. The substance thus obtained is found by Girard and L'Hôte to have the formula $C^{12}H^4(NH^3)2CrO^3$. This bichromate of aniline is sparingly soluble in cold water (about 4 to 1000) and is decomposed by boiling water. It is slightly soluble in alcohol which it slowly transforms into aldehyde. When dry it undergoes no change; when moist it changes greatly under the influences of light and air. It decomposes under slight elevations of temperature, and burns in contact with flame or under the stroke of a hammer. It inflames also in contact with fuming nitric acid; with sulphuric acid it burns like pyrophoric copper. Treated with cold water it gives rise to violet tints; treated with hydrochlorate of aniline and aniline in excess similar colorations are obtained. The authors' purpose is to study the coloring matters resulting from these changes.

GLEANINGS FROM THE GERMAN JOURNALS.

BY JOHN A. MARTIN, PH.G.

Tannin with sodium bicarbonate.—A mixture somewhat like the following: Tannin acid, 3; water, 180; solution of sodium bicarbonate, sufficient for perfect neutralization, is often prescribed in Germany, and, according to *Pharm. Ztg.*, generally a stumbling-block, on account of it soon changing to a dark color, particularly when there is an excess of alkali. To make it remain uniform for a long time, expel the excess of carbonic acid in sodium bicarbonate solution by boiling, and the tannin solution, diluted as much as possible (in proportion of sod. bicarb., 1; tannic acid, 5) is added to the former, after cooling. (*Rundschau*, 1887, p. 447).

Effect of alcohol on pepsin.—To determine the question whether

alcohol exerts any influence on the digestive power of pepsin in solution, Bardet made a series of experiments, showing that the percentage of alcohol present in solution plays an important part. The presence of 20 per cent. had no influence on the digestive power, but it was very visibly decreased by a larger amount, and entirely destroyed when the amount reached 80 per cent.; thus prescribing pepsin in combination with wine is entirely rational, but combinations of pepsin with tinctures must be avoided.—*Pharm. Ztg.*, 1887, p. 398.

Test for castor oil.—Finkener (Mittheil. d. kgl. techn. Vers. Stat. zu Berlin, IV, 141, *Zeitschrift f. Anal. Chem.*, 1887) gives the following: Pure castor oil agitated with 5 volumes alcohol sp. gr. 0.829, at normal temperature (15° C.), forms a clear solution, but if the suspected oil contains only 10 per cent. of other fat oils, as olive, sesame, rape, cotton, or linseed oil, the solution becomes turbid and does not clear at 20° C., the undissolved oil settling to the bottom.—*Pharm. Centralhalle*, 1887, p. 294.

Extract of may-bells (lily-of-the-valley).—Extract jasmin, 100 gm.; extract ylang-ylang, 25 gm.; cardamom seed, 5 gm.; oil of orris-root, 100 drops. Should the odor of cardamom predominate, increase the amount of extract of ylang-ylang.—*Drog. Ztg.*; *Rundschau, Prag*, 1887, p. 431.

Phenol-cocaine, prepared by gently heating phenol 1, with cocaine 2, is, according to Vian, in *Nouv. Remèd.*, recommendable as a powerful local anæsthetic, and worthy of a trial for toothache. For this purpose it can be prepared extemporaneously by dissolving 0.03 cocaine pur. in 50.0 of a 2 per cent. solution carbolic acid.—*Rundschau, Prag*, 1887, p. 448.

Discoloration of lithium salicylate solution.—Julliard (*Bullet. Commerce.*, 1887, June), relates an interesting experience with lithium salicylate. He dispensed an aqueous solution, made by carefully neutralizing lithium carbonate with salicylic acid obtaining a colorless solution, but in a few days the solution was returned, having changed to a coffee-brown color. Colorless and unchangable solutions were obtained from several commercial samples of lithium salicylate; but nearly all had a weak acid reaction and contained sodium compounds. The estimated amount of salicylate of sodium present was 12 to 15 per cent. The question arose whether the salicylate of sodium or the free salicylic acid prevented the discoloration, and he found that this favorable effect is produced by free salicylic acid, even when present

only in small amount, thus again confirming the experience for years with salicylate of sodium, that preparations of salicylates to remain colorless, must contain a small amount of free salicylic acid.—*Pharm. Zeitung*, 1887, p. 423.

Iodol collodium.—According to A. Bilteryst (*Jour. de Pharm. d'Anvers*), a 10 per cent. iodol collodium is prepared as follows:

Iodol.....	10 gm.
Alcohol.....	16 "
Ether.....	64 "
Gun cotton	4 "
Castor oil.....	6 "

Dissolve the iodol in the alcohol and ether previously mixed, add the gun cotton in small portions, and after complete solution add the castor oil. The percentage of iodol can of course be increased to any desired amount.—*Pharm. Ztg.*, 1887, p. 488.

Aquarium cement.—Litharge, fine white sand, gypsum, each one kilo; finely powdered rosin, 350 gm. Carefully knead into a paste with linseed oil, varnish and a small quantity of dryer. It is fit for use in a few hours, and answers equally well for salt or fresh water tanks.—*Ph. Centralhalle*, 1887, No. 22.

Remedy for loose teeth.—Quincerot recommends the following mixture: Tannin, 8 parts; potassium iodide, 1 part; tincture of iodine and tincture of myrrh, each, 5 parts; rose water, 200 parts. Teaspoonful in luke-warm water, as a wash for rinsing the gums in the morning.—*Pharm. Centralhalle*, 1887, p. 398.

Tar troches without sugar.—Mayet, (*Journ. de Ph. et de Ch.*, 1887, I, 491, gives the following: Norwegian tar, 2 gm.; sodium bicarb., 18 gm.; calcium phosphate, 18 gm.; oil of anise, 5 drops. Make 100 troches. Each contains 0.02 of tar.—*Phar. Zeitung*, p. 305.

Preservation of aromatic waters.—To prevent the mouldy smell and taste and loss of aroma, which follow when aromatic waters, particularly rose and orange-flower water, are kept in the cellar for some time, E. Kraft recommends the cork of the container to be provided with a small opening, 1 mm. wide, in the centre, to admit the atmospheric air. Medicated waters kept in this way will never spoil.—*Phar. Zeitung*, p. 311.

Stains of Iodine.—Sulphide of sodium, or sodium sulphydrate, in a ten or twenty per cent. watery solution, applied upon a compress, will remove the stain of iodine from the skin and allay its irritant action when excessive.—*Philadelphia Medical Times*.

PHARMACEUTICAL NOTES ON SOME SYNTHETICAL COMPOUNDS RECENTLY INTRODUCED INTO MEDICINE.¹

By. H. HELBING, Apotheker of the German Hospital, London.

The remarkable increase in the number of organic compounds contained in the *materia medica*, which recently has been even much more rapid than formerly, may be taken as a reliable indication of the progress made by the chemistry of medicine in later years.

When we remember that before the commencement of this century the separation of active principles, like morphine or quinine, from the raw drug was unknown, we cannot restrain from admiration of the vast number of synthetically prepared remedies which have since been introduced, and of which the greater part is of quite recent origin.

In attempting to place before you an account of a number of these modern improvements, I have paid special regard to the pharmaceutical side of the question and have avoided lengthy formulæ, or the minute details of preparation, as also chemical reactions. I have confined myself to giving in alphabetical order a description of certain antipyretics, antiseptics and soporifics, together with suitable combinations and preparations of them. Details are also given of the nature, solubility and therapeutic value of these remedies, besides a few hints which may be found to be of use in dispensing. I also note the melting and boiling point of each, as these are of great importance in determining the purity of the preparation; indeed they supply the chemist with ready means of testing the article for himself at once.

Acetphenetidin, *Paracetphenetidin*, $\text{NH}(\text{COCH}_3)\text{C}_6\text{H}_4.\text{OC}_2\text{H}_5$.

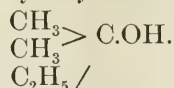
This antipyretic has only been in use for a short time, but the results hitherto obtained with it are described as excellent. Hinsberg and Kast have shown that a dose of 3 to 8 grains is able to reduce the temperature of the human body by 3.6°F ., and the experiments carried out in the clinic of Professor von Bamberger, of Vienna, have only tended to confirm the favorable accounts of the discoverers. It appears to be perfectly devoid of secondary effects, and fully able to bear comparison with all other febrifuges.

It is a grayish-white crystalline powder without smell, producing a slightly pungent after-taste; it is practically insoluble in water, but dissolves readily in alcohol. The melting point is at 275°F . It is advan-

¹ From a paper read before the British Pharmaceutical Conference; reprinted from *Phar. Jour. and Trans.*, Sept. 24, 1887, pp. 263-265.

tageously prescribed in the form of powders containing the above-mentioned dose, since from its tastelessness it is readily taken by patients.

Amylene hydrate.—Tertiary amylie alcohol, dimethyl ethylcarbinol,



Only a few weeks ago this compound was recommended by Professor Jolly and von Mering as a soporific, in which class of remedies it appears to have taken a prominent place. Before applying it to patients, numerous experiments on animals had been carefully carried out. A dose of $\mathfrak{z}\text{j}$. is sufficient to produce sleep for six or eight hours. No unpleasant secondary effects are recorded.

The remedy is given in water (in which it is soluble in the proportion of 1 : 12) with a little juice of liquorice.

Amylene hydrate.

Liq. glycyrrhizæ.....aa $\mathfrak{z}\text{j}$.

Aq.....ad $\mathfrak{z}\text{j}$.

Sig.—To be shaken before use.

It is also administered in capsules of gelatin.

It is a clear fluid with an odor reminding one slightly of camphor ; it is soluble also in alcohol. Specific gravity 0.812 at 53.6° F. Boiling point 216° F.

Antifebrin, acetanilide, phenylacetamide, $\text{C}_6\text{H}_5\text{NH.CH}_3\text{CO}$.

Since the first experiments with this valuable remedy, performed by Drs. Cahn and Hepp, in Strasburg, antifebrin has been carefully studied by others, and with the same satisfactory results. It possesses the advantages over other remedies of this class of being low in price, and moreover the dose is small ; 2 to 10 grains once, twice, or, at most, three times a day sufficing to produce a considerable reduction of temperature in cases of typhoid fever, pneumonia, also in erysipelas and acute rheumatic gout. It is given in powders as well as in solution ; for the latter mode of administration it will be found most advisable to dissolve it in brandy, subsequently adding a little water and syrup.

The following formula is given as an example :—

Antifebrin..... $\mathfrak{z}\text{j}$.

Brandy..... $\mathfrak{z}\text{ivss}$.

Dissolve and add—

Distilled water,

Simple syrup.....of each $\mathfrak{z}\text{vj}$.

One tablespoonful to be taken as directed.

The remedy is thus rendered very pleasant to take, and the patients express no aversion to it.

A good preparation should be of pure white color, and form moderately large crystals, which are but very sparingly soluble in cold water, rather more readily in hot, and easily in alcohol; antifebrin melts at 233.6° , and boils at 563° .

Antipyrin, oxydimethylchinizine, $C_{10}H_9CH_3.N_2O$.—Antipyrin may fairly be considered the most popular of modern antipyretics. The dose varies from 15 to 30 grains twice, three or more times a day. For children 3 to 12 grains will be found to be sufficient. It is of great value in all febrile diseases, reducing temperature very promptly. Of late it has also been applied in subcutaneous injection as a local anæsthetic. In some cases a bright pink rash, like nettle rash, will suddenly appear during treatment; this is considered to be of no importance, as it causes no inconvenience and soon disappears.

Antipyrin is readily soluble in water and alcohol; it possesses but little flavor, and that not unpleasant; and is, therefore, adapted for administration in solution. It thus possesses great advantages over quinine, especially in treating children, who take it very readily if mixed with a little syrup, thus:—

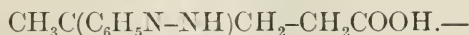
Antipyrin.....	80 gr.
Simple syrup... ..	$\overline{3}$ j.
Water, add to.....	$\overline{5}$ iv.

Two teaspoonfuls for a dose.

This mixture is almost free from bitterness, and children do not at all object to it.

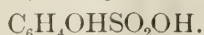
It crystallizes in colorless laminae, which melt at a temperature between 230° and 235.4° F.

Antithermin, phenylhydrazinlevulinic acid,



has been recommended as a febrifuge, but although it is now obtainable in the market, details are still wanting as to dose and effect. It forms large colorless crystals of a slightly bitter taste, which cause an unpleasant grating when ground between the teeth. It is insoluble in water, and but sparingly soluble in alcohol. The most suitable form for administering antithermin is the pilular.

Aseptol, acidum sozolicum, orthophenolsulphonic acid,



By aseptol we understand a $33\frac{1}{3}$ per cent. solution of orthophenolsulphonic acid. It is almost odorless, but faintly suggests carbolic acid, and is reported to possess the antiseptic properties of this latter antiseptic and of salicylic acid, standing, as regards strength, midway between them. Its superiority lies in the possession of antiseptic without poisonous or irritating properties, so that it is especially adapted for abdominal surgery and for ophthalmological operations. Sozolic acid is readily soluble in water, alcohol and glycerin. It is applied in a solution of 3, 5 or 10 per cent., to which strength the stronger solution can be reduced by dilution with water.

Betol, salicylate of β naphthol ether, $C_6H_4OH.COO.C_{10}H_7$.

This remedy is one of the very newest, and analogous to salol. It is applicable therefore in all those cases in which this latter is found to be of use, *viz.*, rheumatism, cystitis, etc. The dose is given as 5 to 8 grains in some cases of intestinal catarrh. As it is not a phenol compound, betol possesses the advantage of being freer from detrimental properties than salol.

It forms small, white, resplendent crystals, is almost devoid of taste, and being insoluble in water is best dispensed as a powder or in compressed tablets, or in pills made up with liquorice juice and powder, each containing $2\frac{1}{2}$ grains of betol. It is soluble in alcohol, as also in fatty oils, and is therefore well adapted for being worked up with butter of cacao into pencils for the treatment of gonorrhœa. These may be prepared by melting four parts of ol. theobromæ, and adding to the warm liquid one part of betol. This readily dissolves in the fat and the mixture is allowed to partially cool, when it is poured into moulds. The finished product contains of course 20 per cent. of betol.

The melting point of betol is 203° .

Hypnon, acetophenon, $C_6H_5COCH_3$.

By means of 3 to 8 grain doses of this very powerful soporific a profounder sleep is produced than that caused by chloral hydrate. Hypnon possesses an agreeable aroma somewhat resembling a mixture of oil of bitter almonds and neroli, but its action on the mucous membrane of the mouth is almost caustic. It is dispensed therefore in capsules of gelatin, each of which contains 1 grain of the remedy combined with 10 of almond oil to prevent any risk of unpleasant effects.

It is a colorless fluid, sparingly soluble in water, more readily so in

alcohol, of the specific gravity 1.032 at 59° F., the boiling point being 410° F.

Methylal, dimethylether of methylene, $\text{CH}_2(\text{O}.\text{CH}_3)_2$.—Methylal is a soporific of very recent date. It is administered in doses of 20 to 25 grains in water, with a little syrup.

Thus:—

Methylal.....	3j.
Syr. orange flower.....	3ss.
Water.....	5j.

One tablespoonful for a dose.

It has also been applied externally as a local anæsthetic dissolved in oil, or as an ointment, with lard as a base. Both forms are made to contain 15 per cent. of methylal.

It is a colorless ethereal fluid which smells like a mixture of chloroform and acetic ether, and tastes pungent and aromatic; it is readily soluble in water as well as in alcohol; the specific gravity at 59° F. is 0.855; it boils at 107.6°

Naphtalin, C_{10}H_8 .—To most fungi naphtalin has been found to be a powerful poison, and has proved very valuable as an antiseptic, being applied in the same manner as iodoform. Professor Rossbach, of Jena, first administered it internally in cases of acute and chronic enteric catarrh, in typhoid fever and acute gastro-intestinal catarrh. It has since been extensively applied, but not with absolutely uniform results. It is given as a powder in wafer in doses of 2 to 8 grains, to which a drop of oil of bergamot is added to obliterate the peculiar smell of tar belonging to it, which makes it otherwise impossible for some patients to take it. For example the following formula may be adopted:—

Naphtalin.	
Sacch. alb.....	āā 30 gr.
Ol. bergam.....	1 gr.

Make a powder and divide into ten doses, one to be taken three times a day.

Naphtalin is a crystalline body forming colorless, resplendent scales; it tastes pungent, is insoluble in water, but sparingly soluble in cold alcohol and fatty oil, but readily if these agents are heated. The solution in oil and the ointments should be made to contain ten per cent. of naphtalin, which must be added to the warm fatty matter. Melting point 176° F., boiling point 424.4°.

Naphtol = β naphtol, isonaphtol, $C_{10}H_7OH$.—As a substitute for tar preparations, naphtol has been applied to the skin with very good results, especially in psoriasis and other chronic affections. A two to five per cent. solution in alcohol is the usual form of application, but it can also be made up into ointment containing three to twenty-five per cent. Internal administration of this compound was attended with toxic effects, and has, therefore, been discontinued.

It crystallizes in resplendent scales, has an aromatic odor, is slightly soluble in hot water, readily so in alcohol and fatty oil. A very good ointment may be made by adding one part of naphtol to ten of melted lard and well stirring. The substance dissolves without much difficulty and forms a white, smooth product.

Naphtol melts at 253° , and boils at 546.8° .

It should not be confounded with naphtalin.

Salol, phenylether of salicylic acid, $C_6H_4OH.COOC_6H_5$. This remedy appears to give the greatest promise of future importance, for in the short time that it has been known, it has done very good service as a febrifuge and an anti-rheumatic, being administered in doses of fifteen to thirty grains two or three times a day, as also as a gargle $\bar{5}ij$. thus—

Salol.....	$\bar{3}ij$.
Spirit. vin.....	$\bar{3}iv$.

A teaspoonful to a glass of warm water for stomatitis and ulcerations of the mouth and pharynx.

A salol mouthwash is also very much recommended, and may be prepared as follows:—

Take of salol gr. 40, dissolve in $\bar{5}iv$. of a suitable spirituous dentifrice liquid. Half a teaspoonful to be used in a glass of water, with which it forms a milky emulsion.

For chronic forms of diphtheria, it is reported to have more powerful effect than solutions of chlorate of potassium or salicylic acid. It is also applied, worked up with butter of cacao into pencils, as an antiseptic. These are prepared in a similar manner to those of betol before mentioned.

Salol is a white crystalline powder of a mild aromatic odor; it is insoluble in water, but soluble in alcohol. The melting point is $108^{\circ} F$.

Thallin $C_9H_{10}N(OCH_3)$.—Thallin is employed either as sulphate or tartrate. It is rapidly obtaining a recognized position in the materia

medica, for it is a reliable and powerful antipyretic, applicable in all kinds of febrile conditions. Three to eight grains in pill are considered a suitable dose. It is also applied externally, especially lately, with great success for injections in cases of acute and chronic gonorrhoea, for which it is prescribed in aqueous solutions containing one drachm of the thallin salt in $\bar{5}vj$.

Salts of thallin are crystalline powders, not quite pure white in color, of a bitter and intensely aromatic taste, and of a peculiarly persistent odor, which is similar to that of cumarin; they are readily soluble in water, but far less so in alcohol.

Urethan.—Ethyl of urethan, $CO(NH_2).OC_2H_5$. As a mild hypnotic urethan is very useful, being administered in doses of fifteen to forty grains, either as a powder or in solution, with a little syrup as a corrective. Thus—

Urethan.....	$\bar{3}ij$.
Syr simpl.....	$\bar{3}j$.
Aquæ.....	$\bar{3}iij$.

Two tablespoonfuls for a dose.

It not does produce a comatose condition like chloral-hydrate, but tends to induce a healthy natural sleep in cases where this is impeded by other causes.

It is a crystalline body of a mild ethereal odor, tastes somewhat like saltpetre, is soluble in water and alcohol, and melts at about 120° F.

CASCARA SAGRADA.

By DR. E. R. SQUIBB.

Rhamnus Purshiana is a sub-variety of the Buckthorn family of small trees and shrubs, which grow in most of the temperate climates. This sub-variety grows abundantly in California and Oregon, and the bark under the name of Chittem bark or cascara sagrada has been long known and used as a purgative, and the name cascara sagrada has more recently been usefully contracted to cascara. Some years ago it was taken up and pushed as a novelty, and by vigorous advertising, as a panacea for numerous ills, it has come into very common use, in the form of several pharmaceutical preparations.

There seems to be no doubt but that the bark of the branches, and a well-made fluid extract, and extract of this bark, are all effective simple aperients, not very disagreeable in taste or effect, easy of

management, and not very liable to lose their effects by continuous use. And a prominent advantage in their use is that the dose may be adjusted in each individual case to any degree of activity or mildness without leaving a persistent reaction.

These peculiar characteristics have long been known as belonging peculiarly to the bark of *Rhamnus Frangula*, and the use of this both in Europe and this country long antedated the use of *cascara sagrada*. And this longer and better known variety of the Buckthorn family was admitted to the present revision of the Pharmacopœia, because it was supposed to be the better medicinal agent of the two. Its supposed advantages over *cascara* are that while having all the advantages of *cascara*, it is milder, more pleasant and more manageable in effect and more agreeable in taste, and less liable to disturb stomachs and intestines which are sensitive or irritable. When properly used both are simple, mild, agreeable aperients, but the buckthorn the more simple and agreeable of the two, and required in somewhat larger quantities to give the same effect. Hence one or the other is superfluous in the materia medica, and it becomes important to know which should have the preference.

In order to assist in determining which is the better, large quantities of the two barks were carefully selected of uniform good quality, and from these exactly parallel extracts and fluid extracts were made, and have been placed in the hands of many close and careful observers, who are as little prejudiced as may be by the florid advertising, which one of the agents has received. By the parallel observations of many, made independently, it is hoped to obtain useful, if not conclusive, testimony.

Both barks are very plentiful and very cheap, and good qualities are easily obtainable of either at a cost of not more than eight or nine cents per pound by the bale. The buckthorn is much more uniform in quality than the *cascara*, and the inferior qualities of this, which are offered at five to seven cents per pound, are better than the inferior qualities of *cascara* at similar prices. Both come long distances, and the freight on the buckthorn from Germany is less than upon *cascara* from California, and how it is possible to pay freights and two or three profits on them and sell them at such prices, is not easy to comprehend. The very different and inferior bark of the trunks and larger branches are rarely or never seen in buckthorn. But the markets are full of such bark from the *cascara*, and it is difficult to get even a few bales of the smaller

quill bark which should alone be used. Both barks are said to improve very much in their medicinal qualities by age, and if so, it is reasonable to suppose that the preparations made from them also improve by age, but probably not so much as the barks do. Neither bark should be used until it is over a year old in the dry state, and this condition is more easily secured in the case of buckthorn than cascara.

The menstruum used for exhausting these barks by repercolation is important, and that which the writer has for many years used with buckthorn has been very successful. And there is hardly an instance known wherein the process of repercolation is more important or more successful. In another part of this pamphlet an example is given in detail of the management of buckthorn, and cascara was and is treated in exactly the same way with corresponding results, as far as the process is concerned.

This process gives preparations easily miscible with water, wine or syrup, and therefore easily taken and easily appropriated by the stomach and first passages.—*Ephemeris*, Oct. 1887, page 984.

In the same number of *Ephemeris*, page 1045, Dr. Squibb has an elaborate article of *Fluid Extract of Rhamnus Frangula*. The menstruum is a mixture of 25 per cent. alcohol, 5 per cent. glycerin, and 70 per cent. water. The bark in No. 20 powder is moistened with 75 per cent. of its weight of this menstruum; after maceration for twenty-four hours the bark is brought back to about its original condition of moisture and has swelled to the maximum. It is then sifted and packed firmly and allowed to percolate at the rate of about 60 drops per minute, when the quantity of the dry bark is about two pounds, or a kilogram. The preparation is finished by repercolation, no heat being employed.

A SPURIOUS CUBEB.¹

By WILLIAM KIRKBY, F. R. M. S., *Pharmaceutical Chemist*.

The large extent to which cubebs have been adulterated during the last few years is so well known to every pharmacist that it will hardly be a matter of surprise that I should bring another instance of cubeb substitution under your notice.

In 1885 (*Pharm. Jour.*, [3], xv., 653) I described a false cubeb

¹ Read before the British Pharmaceutical Conference; reprinted from *Phar. Jour. and Trans.*, Sept. 24.

which a little prior to that time had been spoken of as being probably the fruit of *Piper crassipes*. My paper appears to have had the unexpected result of confirming the opinion that such was the source of this drug, although I distinctly pointed out how it differed from the description given in the "Pharmacographia" of a reputed specimen of *P. crassipes*: namely, in *P. crassipes*, having a pedicel from one and a half times to twice as long as the berry, and having a very bitter taste, while the berry described has a pedicel usually about the same length as the fruit, and a taste which cannot be described as very bitter. Instead of referring to this variety therefore as *Piper crassipes* I shall call it the "short-stalked" variety, leaving the identity of it to be determined by an examination of authentic fruits, which I hope to be able to undertake when the necessary material comes to hand.

At the beginning of this year I received from Mr. E. M. Holmes a supply of false berries, more nearly resembling cubebs in certain respects than any previous substitute.



FIG. 1.

Like cubebs they consist of a berry supported on a non-articulated stalk. The globose head is generally flattened on the top, with sometimes a slight elevation at the apex; the base is suddenly contracted into the pedicel, which not infrequently arises from a depression, and is stouter than in the true drug as well as being laterally compressed. In color they vary but little, being of a dark brown tint; they are more or less wrinkled according to the stage of their development. When freshly bruised an abundance of essential oil exudes, having an agreeable camphoraceous odor, reminding one strongly of cajuput; the taste is aromatic, somewhat pungent and bitter. The diameter of the head ranges from four to seven mm., and the length of the stalk from seven to eleven mm., being from one and a half times to twice as long as the berry (fig. 1). In the more fully developed fruits, known by their comparatively smooth skin, the perisperm is seen to be white and starchy.

The pericarp consists of the same number of layers as in cubebs

(fig. 2). In my previous paper the example of other writers² was followed in applying the term testa to the inner shell of the pericarp. This I now think to be incorrect, for though there are four distinct layers in the pericarp the testa and the tegmen are found attached to the seed, which is only united to the hard inner shell of the pericarp at its base. It will therefore be seen that the terms used in this paper have not reference to the same parts as in the former one.

The epidermis is composed of small, flattened cells covering an interrupted ring of cubical, sclerotic cells. Within this is the broad layer of loose parenchyma interspersed with larger cells containing oil.

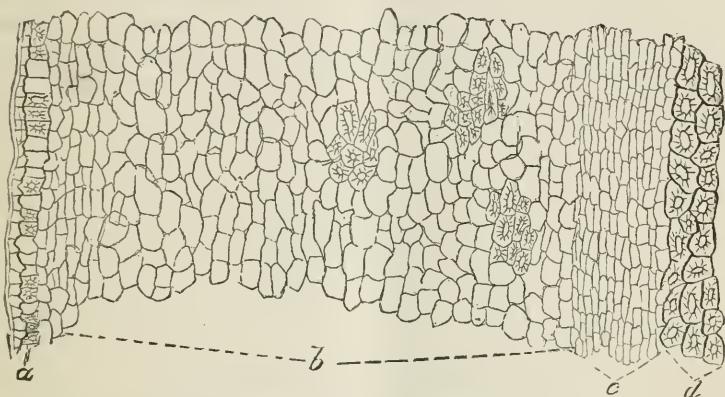


Fig. 2.—Section of pericarp of spurious cubebs $\times 62$. *a*, epidermal layers; *b*, epicarp; *c*, mesocarp; *d*, endocarp.

These latter resist the action of strong sulphuric acid to a greater extent than the surrounding tissue, and the oil is not colored by being left in contact with it. Small groups of stone elements are present in it; also a quantity of starch. The succeeding portion comprises about eight or ten rows of regularly arranged thin walled cells, extended tangentially; it is free from starch, but the inner rows contain small crystals of calcium oxalate. I find that crystals are likewise present in the "short-stalked" drug and in the cubebs; but are much smaller, indeed in cubebs they are almost indistinguishable, hence my failure to discern them before. In both these instances calcium carbonate was found, while but little is present in this specimen.

² 'Pharmacographia,' 1874, p. 522.

From this it may be inferred that there is some connection between the two salts. The inner part of the pericarp, found as a hard shell, and described before as the testa, consists of two, or, occasionally, three courses of angular, isodiametrical, sclerotic cells. Between the epicarp and mesocarp are from sixteen to eighteen woody bundles; the xylem is composed of a few spiral vessels, and the phloem of soft bast with one or two fibres. The seed is in structure identical with that of cubebs, the integuments consisting to two membranes, and the perisperm of hexagonal cells, radially elongated, containing an abundance of starch. The starch granules are small, angular, and have a very distinct central hilum. The greater portion of the cells contain a globular starch body, consisting of an agglomeration of starch granules; these are a very characteristic feature (fig. 3). Strong sulphuric acid reveals no specialized cells by any color reaction.

In structure this drug differs from cubebs in having stone elements

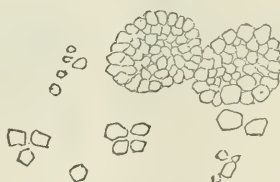


Fig. 3.—Starch of spurious cubebs $\times 620$.

in the epicarp, in having more than four rows of cells in the mesocarp, in the endocarp having isodiametrical stone cells in more than one row and not radially extended, in the larger crystals of calcium oxalate in the mesocarp, in having the round starch bodies in the perisperm, and in the oil giving no color reaction with sulphuric acid. It differs from the "short-stalked" drug in the same particulars with the exception that they both have about the same number of cells in the mesocarp.

In the unground state it may be distinguished from cubebs by its larger size, less wrinkled surface, flattened pedicel, its cajuput odor when bruised, and by giving no carmine color when crushed on a white surface, and treated with strong sulphuric acid. From the "short-stalked" variety it may be known by its longer pedicel, darker color and different odor. In the powder it may be at once recognized by its characteristic starch bodies.

NAREGAMIA ALATA, THE GOANESE IPECACUANHA.

BY DAVID HOOPER, F. C. S.

Dr. Dymock, in his "Vegetable Materia Medica of Western India," describes *Naregamia alata*, W. and A., of the natural order of Meliaceæ, as the country ipecacuanha of the Portuguese at Goa, and states that it is the best indigenous emetic he has met with in that part of India. As the drug seems to be devoid of history it was probably unknown in the sixteenth century, when the intelligent and observant Dr. Garcia d'Orta was for thirty years physician to the Viceroy's Court and the hospital at Goa. In confirmation of the recent introduction of naregamia, its use does not appear to have extended far beyond its habitat. The plant grows from the Concan southwards by the Malabar coast to Travancore, preferring the slopes of the Western Ghauts. By the natives in these regions it is used as an emetic, and as a remedy for bile, rheumatism and indigestion, usually in the form of a decoction or infusion. The sample that I have examined was kindly procured for me by Mr. Ferguson, of Calicut; it was collected some nine or ten miles from the town, where it has a reputation in cases of fever, and grows in some abundance.

Vernacular.—Kápúr bhendi, pit-wel, tinpana (*Marathi*), trifolio (*Goa*), nelanaringu, nelakanu-gida (*Canarese*).

Botanical Characters.—The naregamia plant (of which there is only one known species in India) is a small glabrous or shining undershrub, not more than a foot in height, with several slender, woody, erect or decumbent stems, with few branches. The leaves are from one to four inches long, and trifoliolate. Leaflets, sessile, cuneate-ovate, entire or obtusely lobed, terminal leaflet rather larger than the lateral ones and about the length of the common winged petiole. Peduncles axillary, solitary, one-flowered. The flowers are about one inch long and quite white. Styles yellow. Capsules triangular and three-valved. It is a very attractive plant in the flowering season, which extends from the middle of April to the middle of June.

Description.—The drug consists of the root with the slender stems attached to it, the leaves having been stripped off. The root stock is contorted and warty and with the roots is pale brown in color; the mealy suberous layer may easily be removed by rubbing. The stems are of a dirty green, with the bark more firmly adherent. A transverse section of the root exhibits a brown outer layer of bark with a light-colored interior, and a yellowish wood. If the section be touched

with a drop of iodine solution a blue ring will appear in the bark, showing the presence of starch in the librous portion. On account of the hard wood the drug is very difficult to powder in a hand mortar. The activity of the drug resides in the cortical portion, but as this forms one-third, and the woody material two-thirds of the whole, it differs from the true ipecacuanha. The powder is light-brown; it has a peculiar aromatic and pungent odor, and a slightly bitter and nauseous taste.

Chemical Composition.—Powdered naregamia was treated both consecutively and independently with the following solvents:—Ether, alcohol, water, diluted acid and diluted alkali. The ether extract contained an *alkaloid*, an *oxidizable fixed oil* and a *wax*.

The alkaloid was separated by agitating the extract with diluted sulphuric acid, and the clear colorless solution at once afforded precipitates by the usual reagents. The alkaloid was left as an amorphous, slightly colored residue of a brittle consistence, on the gentle evaporation of its ethereal solution. It formed crystalline salts with sulphuric, nitric and hydrochloric acids, but gave no satisfactory color reactions when mixed with the concentrated acids. It was precipitated from its solutions by tannin, potassio-mercuric iodide, phosphomolybdate of soda, and iodine. It differs from emetine in readily forming acicular crystals with acids, and by not giving any color with chlorinated lime and acetic acid; and it differs from the principal cinchona alkaloids by its optical inactivity. Having such definite peculiarities in its properties and reactions, I propose to call this alkaloid after the generic name of the plant, *naregamine*.

The fixed oil was soluble in strong spirit, soluble also in dilute caustic soda with a brown and red fluorescent solution. The wax was insoluble in spirit, it was colored brown and afterwards black by sulphuric acid.

The alcoholic extract consisted mainly of *sugar* with some little resinous matter. No tannic substances were detected, but a body precipitable by neutral plumbic acetate, related to an organic acid.

The aqueous extract evaporated to a small bulk, and treated with two volumes of alcohol, gave a precipitate of *gum*. The filtrate from this, evaporated and treated with four volumes of alcohol, caused a precipitate which after standing some hours separated out into large colorless rhombic prisms. A crystalline alkaloidal substance soluble in water, insoluble in strong spirit, having an acid reaction, containing

nitrogen, and occurring in this extract, shows that it is allied to, if not identical with, *asparagine*.

Among the less important constituents of *naregamia* are *albuminous*, *pectinous* and *coloring* matters, *starch*, *cellulose*, *woody fibre* and *ash*. The starch is in minute rounded granules of about the same size as rice. The ash is of a reddish color, and contained 10 per cent. insoluble in hydrochloric acid.

The following table will show in what amount the various principles occur:—

Ether extract.....	2.93
Alcoholic extract.....	5.40
Aqueous extract.....	7.00
Albuminous matter, etc	7.61
Starch and cellulose.....	17.66
Woody fibre.....	44.77
Ash.....	5.52
Moisture.....	9.11
	<hr/>
	100.00

Medical Properties.—About one ounce of the powdered *naregamia* was sent to Surgeon-General Bidie, who undertook to have some experiments made on its therapeutic action in the Monegar Choultry Hospital, Madras. I have been favored by Dr. Bidie with the medical report, which contains the following information:—"The powder was tried in two cases of dysentery. The first patient had a very severe attack of the disease, and had recovered from a similar attack only a month before, and was in consequence in a very weak and emaciated state. After three doses, all traces of blood in his motion disappeared. The drug was administered in doses of 20 grains, preceded by 15 minims of tincture of opium. The second patient also recovered rapidly, but the disease was not so severe as in the first case. As an emetic its effects were exactly similar to the official drug, 20 grains acting as an effectual emetic in an adult. It was also tried in small doses as an expectorant in catarrhal affections with good results, and was effectual in the treatment of children suffering from bronchitis."

The results of these experiments confirm Dr. Dymock's experience of the emetic property of *naregamia*, and Dr. Bidie intends to have more extended trials made with it in dysentery and other complaints.

Pharmacy of Naregamia.—The "vinum" being a recognized prepa-

ration of the true ipecacuanha, a vinum naregamiae was made by using sherry containing 15·16 per cent. absolute alcohol by weight, 2·4 per cent. solids, and traces of tannin. The finished product, however, could not be recommended as a suitable preparation, for the following reasons: 1. The wine deposited after standing a few days. 2. Large doses were taken, much in excess of the official wine, without producing an emetic effect. 3. Naregamine is precipitated by tannin, which is frequently found in sherries. 4. Naregamine was detected with facility in the residual marc. If a liquid preparation is required, I should suggest a tincture made with the powdered drug and rectified spirit of the strength of two and a-half ounces to one pint. The alcohol dissolves out the alkaloid and most of the fatty constituents, and the tincture exhibits the activity of the root. Powdered naregamia is the form in which it will chiefly be used; it is conveniently carried about, and is simple in its administration.

OOTACAMUND, INDIA.

—*Phar. Jour. and Trans.*, October 15, 1887, p. 318.

TWO SPECIES OF VESICATING BEETLES FROM SOUTH AFRICA.¹

BY J. OLDHAM BRAITHWAITE, Pharmaceutical Chemist.

A small consignment of native "blistering flies" was recently sent from Cape Colony to Messrs. Hale & Son, the well known drug brokers, by one of their clients there, who states that the beetles are much used by the natives and by local medical practitioners for producing vesication. It was thought possible that they might be usefully introduced here as a substitute for the "Spanish" and "Chinese flies," or as a profitable source of cantharidin. Having casually seen a few specimens, I applied to Messrs. Hale, who were good enough to request me to examine the beetles, and to furnish me with a sufficient quantity for a preliminary investigation.

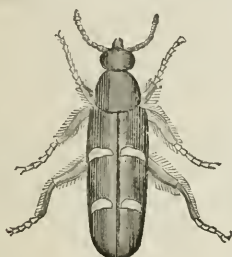
The sample was composed of two species of *Mylabris*, neither of which could I find described in such pharmacological or entomological works as were accessible to me. For the identification of the species I am indebted to Mr. Cahan, of the Entomological Department of the Natural History Museum, who courteously informs me that they are

¹ From a paper read before the Brit. Pharmac. Conference; reprinted from *Phar. Jour. and Trans.*, Sept. 17.

two species of *Mylabris* common in South Africa, *Mylabris bifasciata* and *Mylabris lunata*, and that there appears to be no record of either species, other than technical entomological descriptions. Under these circumstances I have thought that a description would not be without interest from a pharmacological point of view.

It was first necessary to separate the two species, which was easily done; it will be seen from the following figures and description, that they do not very closely resemble each other either in size or markings. It was found that *Mylabris bifasciata* comprised the bulk of the sample, namely, ninety-three per cent. of the whole; the smaller, *M. lunata*, only being seven per cent.

Mylabris bifasciata varies in length from 20 to 25 millimetres; the antennæ are about 5 millimetres long, moniliform, consisting of eleven joints, the first two basal joints black, the remainder yellow, gradually



MYLABRIS BIFASCIATA.



MYLABRIS LUNATA.

increasing in size from base to apex; the head is gibbous, about 3 mm. in length, eyes prominent; thorax pentagonal, 4 mm. long by 3 mm. wide. Elytra, 15 mm. long, by 5 broad, crustaceous, convex, black, traversed by two undulating dark ochraceous-yellow bands, about 2 mm. in depth; the apical band is bordered by a rufescent margin, and is more rounded at the costal end than the basal band. The tarsi of the first two pairs of legs are five jointed, those of the last pair have four joints.

Mylabris lunata varies in length from 14 to 18 millimetres. The antennæ consist of eleven articulations, moniliform, gradually increasing in size from base to apex, the first four basal joints black, the remainder ochraceous-brown. Head gibbous, eyes prominent, thorax equal in length and breadth. Elytra, 13 millimetres long by 4 broad; crustaceous black, traversed by two

transverse sinuous bands, and having a very conspicuous reniform or semilunar spot at the base of each wing case, also another lenticular spot on the under costal basilar margin, which is not visible unless the beetle is turned over on its back. The color of all these markings varies in different individuals, from a dull ochraceous-yellow to a bright lemon-chrome. The tarsi of the first two pairs of legs are five jointed, those of the last pair have four joints.

The next step was to determine if either species were active vesicants, and if so, the proportion in which the blistering principle existed. As the quantity of *Mylabris bifasciata* available was so much greater than that of *M. lunata*, this species was operated on first.

NOTE BY THE EDITOR.—By exhausting the beetles with acetic ether, washing the extract with carbon bisulphide and with a little alcohol, then recrystallizing from chloroform, the author obtained 1.02 per cent. of cantharidin. In another experiment, omitting treatment with chloroform, the yield was 1.09 per cent. A sample of *Cantharis vesicatoria* yielded 0.42 per cent.; but *Mylabris lunata* only 0.296 per cent.

Mr. Braithwaite states that the highest record of cantharidin he could find was from *Lytta aspersa*. R. Wolff reported (*Arch. Phar.*, Jan., 1877) the yield to be 0.855 per cent. We obtained (*Proc. Am. Phar. Asso.*, 1872, p. 258) from *Mylabris eichorii* 1.016 per cent., and L. Fahnestock (*AM. JOUR. PHAR.*, 1879, p. 297), from the same lot of these beetles nearly 1.25 per cent., the increased yield being probably due to the presence of less moisture, and from *Cantharis vittata*, 1.03 per cent. of cantharidin.

Preservation of Leeches.—J. T. writes to the *Chemist and Druggist*, August 6, 1887: "I never give leeches any meat or worms; they are kept in an earthenware vase, which has been in use about fifty years, with glass cover and perforated zinc rim; in the bottom are a few pebbles, and part of an earthenware drainer, through the holes of which the leeches crawl when they require a little help to cast their skins. The ordinary tap-water (off the limestone) with which they are supplied is changed three times a week in summer, and once or twice a week in winter. Loss or complaints are very rare, sometimes not once in six months. I always dry leeches before selling, for two reasons; (1) because they bite more readily, and (2) because the glue of the box is often moistened when they are sent a distance. I should think the weeds, earth, etc., which some advocate, would make it rather difficult to find half a dozen or so.

SIMPLE SUGGESTIONS FOR THE PURCHASE AND ASSAY OF COMMERCIAL CARBOLIC COMPOUNDS USED FOR SANITARY PURPOSES.¹

BY JOHN MUTER, F.R.S.E., F.I.C., AND L. DE KONINGH, F.I.C.

Owing to the extensive use of these compounds by the various local sanitary authorities throughout the country, and the occasional demands on the official analyst for their valuation, it is very desirable, both in the interests of the producers and the consumers, that there should be some simple and definite methods agreed upon for their analysis. Up till the present time we venture to think that if the same sample were sent to any dozen analysts, taken by chance all over Great Britain, not more than two or three would come within measurable distance of each other in the percentage of carbolic acid found, while it is more than probable that the manufacturer's chemist would disagree with all. This state of things is caused:

(1) By the fact that, very probably, nearly all the operators would employ a process of their own devising, and that, although most would work upon similar lines, yet the details would be so different as to cause a very wide divergence in the finished results.

(2) By the fact that, in commercial mixtures of carbolic acid and the higher phenols, the commonly adopted methods come entirely to grief.

The process of Koppeschaar (although we continually meet with some one who has modified it so as to render it perfect) is totally unreliable for commercial use, because it is full of pit-falls. For example, to begin with, we have the necessity of working on such small quantities that any experimental error is multiplied by something like 1000; and then, as we are really to a great extent precipitating cresol and calculating it as phenol, we cannot on the face of such a fact expect much truth in the result. This is not, however, all because the process is not to be depended upon even when dealing with pure medicinal acid. One may set to work to make a series of test experiments, and may theorise that, if it can only be arranged so that we work with the same excess of bromine and for the same time, we are bound to get concordant results. If any one has succeeded in really carrying such reasonable theory into practice without meeting with some unaccountable differences in the very first long series of experiments, then he has been much more lucky than we have ever been,

¹ Abstract of a paper published in *The Analyst*, October, 1887.

and, so far as we know, we have tried every published modification, besides those resulting from our own experiments.

Another thing which tends to lead to much dissatisfaction in such matters is the tendency of local authorities to contract wildly for powders or liquids "containing (say) fifteen per cent. carbolic acid," without getting their medical officer to ask the analyst whether such an article really exists in commerce. The manufacturer takes such a contract with a light heart, because he knows he can practically put in an acid as tarry and weak as he likes, and argue (if challenged) that he really put in fifteen per cent. of "commercial" carbolic acid, and bring reliable witnesses, if needful, to prove they saw it done. Meantime the powder is complained of and sent to the analyst, who is asked to state the percentage of carbolic acid. He does this according to his lights, and naturally takes the words of the contract as literal, and reports the amount of *real phenol* he finds. This being generally microscopic, the authority becomes indignant, and the manufacturer, in defending himself as above shown, hints that the analyst is incompetent, and generally gets one or two persons on the local board to believe him. If, in such matters, the boards could be induced to consult their analyst before issuing the form of tender, they would then learn that words like those we have above commented upon are absolutely useless in such cases, and that it is ridiculous to ask for a thing which never could be supplied in practice within any reasonable limit of cost.

It may be now taken as a tolerably well admitted fact that, setting aside the necessities of surgery and medicine, the cresol and other higher phenols are just as good for ordinary antiseptic purposes as real carbolic acid itself, and that unless the presence of such congeners be permitted, the cost of disinfectants of this class would be quite prohibitory. It is therefore sufficient that the analyst should see that his board is being supplied with an article which is all made up of mixed phenols, and not with tar oils, containing only a small proportion of such bodies.

There is nothing more involved in the processes than the following well-known data :—

(1) Phenol, cresol, and their homologues are completely soluble when shaken up with a five per cent. solution of sodium hydrate.

(2) Liquefied phenol and the corresponding cresol are insoluble in a saturated solution of sodium chloride.

(3) In the presence of a sufficient excess of alkali, even a largely diluted solution may be boiled down without the slightest appreciable loss of phenol or cresol.

(4) Tar oils and naphthalin are only very slightly dissolved by the alkali, and may be perfectly removed from the solution by agitating it with benzol.

Taking these ascertained facts, we apply them in the following manner, taking each case in turn :—

(1) PROCESS FOR THE VALUATION OF A CARBOLIC POWDER IN WHICH THE BASE IS NOT LIME, AND THE PHENOLS ARE CONSEQUENTLY NOT IN COMBINATION.

Weigh out 100 grammes of the powder, and transfer the same to a flask, and add 400 cc. of methylated spirit; then, having introduced a well-fitting cork, agitate for a minute or two at intervals during an hour, and finally set the whole aside to settle. When subsidence is complete, pour or filter off 300 cc. of the supernatant liquid, which thus represents 75 grammes of the original powder actually taken for analysis. Here it may be noted that in laboratories fitted with the specially large "Soxhlet" apparatus required, a more rapid and economical method is to mix the original powder with bran, and to extract it in such an apparatus, with just sufficient spirit to do the necessary work.

To the spirituous extract of the powder, obtained as above described, 200 cc. of 5 per cent. solution of sodium hydrate are now added, and the mixed liquids are evaporated to about half their bulk. At this point any tar-oils or naphthalin present will separate out, and are to be removed by filtration. The filtrate, freed from these impurities, is now evaporated down to a bulk not exceeding 50 cc., and transferred to a specially constructed measuring tube surrounded by cold water, the basin being rinsed out with water, so that the entire amount of fluid in the tube shall be exactly 65 cc. The tube employed is of peculiar form, capable of holding over 110 cc. and is specially graduated and stoppered. It is wide at the base, and is narrowed at 65 cc. from the bottom to such a diameter as to show, when graduated, .25 of a cc. The first graduation is at 20 cc. from the bottom, the second at 65 cc., and then the delicate graduations (in .25 of a cc.) commence and continue for 45 cc. more up to 110 cc. The tube is furnished with a long stirring rod made as thin as possible, and projecting above

the tube to a convenient extent. [These tubes are to be procured from Mr. Cetti of Brooke street, Holborn, who knows them as "Muter's carbolimeters," and the entire apparatus costs 8s. 6d.] Before proceeding to use the tube for the first time, it is necessary to find the allowance to be made for the rod. This is done by filling the tube with brine up to the 75 cc. mark and then pouring in liquefied carbolic acid up to the 85 cc. mark. The rod is now introduced and the amount of displacement it causes noted, so that an equivalent allowance may be made on all future experiments.

The measuring tube having been charged, as already described, we now proceed to add very cautiously, and with constant stirring 25 cc. of strong hydrochloric acid, and when that is all in, we follow it with a teaspoonful of common salt. All the phenols now rise to the surface, and when the whole is at the temperature of 60°F., the volume is read off, which gives the amount of commercial carbolic acid present in the 75 grammes of powder. If a perfectly accurate result be required, it is necessary to remove some of the floating acid with a pipette, take its specific gravity, and correct the volume reading to weight.

(2) MODIFICATION OF THE ABOVE PROCESS FOR USE WITH POWDERS ON A LIME BASE, WHERE THE ACIDS ARE COMBINED.

Before proceeding with the spirit extraction, the weighed portion of the powder is to be treated in a capacious mortar with successive small quantities of diluted sulphuric acid (one in three) until the whole mass has a faintly acid reaction, and then the process applied as above described. It is necessary to be very particular about the treatment in the mortar, because, if the least particle of the powder escapes the action of the acid, the results are vitiated, while at the same time, any marked excess of acid should be avoided. Both pestle and spatula must be thoroughly used.

(3) EXAMINATION OF A SAMPLE OF COMMERCIAL CARBOLIC ACID.

Case 1. The sample is dark in color.—Put some of the sample into the "carbolimeter" up to the 20 cc. mark, then gently add 5 per cent. solution of sodium hydrate up to the 100 cc. mark, and lastly add 10 cc. of benzol. Put in the stopper, and having inverted the tube once or twice, plunge it into cold water. Repeat this shaking and cooling until the separation is complete. Read off the volume of the dark layer, which will now have formed beneath the 100 cc. mark,

and the amount of this will give the tar-oils, etc., present in the sample. Provided there is no excess of water, this amount is deducted from 20 cc., and the difference multiplied by five gives the percentage strength of the sample. Excess of water (which is of very rare occurrence) is best ascertained by adding some of the sample to three times its volume of benzol, when it should dissolve quite clear if there be no such excess.

Case 2. The sample is not darker than pale sherry.—Try if it dissolves nearly clear in four times its volume of 5 per cent. solution of sodium hydrate, and if so, it may be taken as practically free from tar-oils. If not, treat it as above, using however, only a very small fixed volume of the benzol. This acid is apt to contain excess of water, which must be estimated by shaking 20 cc. of the sample in the "carbometer" with 80 cc. of saturated solution of sodium chloride, and observing the diminution in volume that will take place if such excess be present.

A fair idea as to whether the acid is chiefly phenol or cresol may always be obtained by applying the bromine reaction, and observing the nature of the precipitate.

(4) EXAMINATION OF A SAMPLE OF PURE CARBOLIC ACID IN THE LIQUEFIED FORM.

In examining samples of this acid, specific gravity practically goes for nothing. The points to determine are:—(1) That it should entirely dissolve to a perfectly clear solution in four times its volume of 5 per cent. solution of sodium hydrate; (2) That, when shaken with an excess of saturated solution of sodium chloride, as already described, it suffers no diminution in volume; (3) When treated with bromine water in excess it gives a fine curdy precipitate, not at all inclined to stick to the tube.

Photoxylin, a substance in use among photographers, was recommended some time ago by Dr. Krysinski as a suitable material for mounting microscopic specimens, and more recently still it has been utilized by Professor Wahl, of St. Petersburg (*Lancet*, June 18, 1887), in surgical practice. A five per cent solution in equal parts of alcohol and ether he finds preferable to collodion, as it adheres more firmly to the skin, not being so easily rubbed off in washing. It is absolutely impervious to liquids, and exerts a perfectly even compression on the tissues.¹

¹ Gun cotton soluble in a mixture of equal parts of alcohol and ether.—EDITOR.

VARIETIES.

Iodoform Wicking.—Gersung, of Vienna, has found wicking impregnated with iodoform, an excellent material for tampons in the drainage of wounds whose secretion is moderate; in Billroth's clinic wicking saturated with tannin and iodoform is used with excellent results. Its removal is much less painful and inconvenient than that of gauze.—*Centralblatt für Chirurgie; Med. News*, September 24, 1887.

Inhalation for Acute Coryza.—Fritsche, of Berlin, has found the following useful:

R.—Acid. acetic. glacial

Acid. carbolic.....aa... gr. xxx

Mixt. oleoso-balsam..... ʒ ij

Tr. moschi..... ℥ xv

M.

Fifty drops of this may be put upon cotton and enclosed in a convenient flask. Inhalations, at first every half hour, and later at longer intervals for ten minutes, will be found beneficial.—*Berliner klinische Wochenschrift; Med. News*, August 20, 1887.

Arseniate of Lithium is recommended by Dr. Martineau, in diabetes in the following form: carbonate of lithium, 3 grs.; arseniate of sodium, $\frac{1}{10}$ gr.; carbonic acid water, 2 pints. Solution is effected under pressure. The effervescing liquid is taken mixed with claret, the foregoing dose to last for at least three days, being taken at the two principal meals of the day customary in Paris. No change of diet is necessary. Dujardin-Beaumetz and others are skeptical about the value of this treatment, but it is simple and easy, and when the patient is not dangerously ill, it will do no harm to try it.—*Technics*.

Cyanide of Mercury in the Treatment of Diphtheria.—Bree (*Inaug. Dissert; N. Y. Med. Jour.*, July 23, 1887), reports 318 cases of diphtheria treated with mercury cyanide, with only four deaths. At the outset he gives from two to three drops of a 1-to-1000 solution in alcohol, every four hours, afterward diminishing the dose progressively. The remedy is said to oppose the extension of the morbid process and to ameliorate the subjective symptoms. In the course of a night, a threatening case has been so mitigated as to come to an end in three days. Thus involvement of the larynx or the nasal passages and the occurrence of sequelæ are prevented with almost absolute certainty, and the convalescence is shortened.

Colorless Tincture of Iodine.—The *Medical Press* publishes the following formula: Iodide of ammonium, ʒ ij; iodoform, ʒ ss; ammonia water, ʒ ss; alcohol, ʒ ijss. The mixture should be left exposed to the light eight or ten days, when all trace of color is gone.

Fluid Extract of Quebracho is claimed by Bourdeaux (*Arch. Méd. Belges*), to be a useful application to burns, ulcers and frost-bites; it dries in the course of half an hour, forming a tough and very adhesive brownish crust, which can be removed only with the aid of warm water; and cicatrization advances rapidly.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, October 18, 1887.

The meeting was called to order by the Registrar, and Mr. A. P. Brown was asked to preside. The reading of the minutes of the last meeting was dispensed with:

Donations to the Cabinet and Library:—The Actuary stated that he had placed in his hands by Miss Williamson, daughter of the late Peter Williamson, the certificate of his membership in the Philadelphia College of Apothecaries, the institution out of which grew our College of Pharmacy. This certificate is especially interesting, as being probably the only one in existence of that early date (October 5, 1821), and as having belonged to him who was the first Secretary of the Board of Trustees of this College, and who had shown so much interest in its welfare. It was accompanied with four volumes, *viz*, James' Dispensatory, 1742; Quincy's Dispensatory, 1782; London Dispensatory, 1826; Nicholson's Dictionary of Chemistry, 1808. The meeting directed the thanks of the College to be returned by the Registrar.

The Actuary presented, on behalf of Mr. H. A. Zug, four very handsome specimens of coral. Mr. Zug was formerly one of the Inspectors in the Custom House, and seeing frequent opportunities for purchasing such articles, made quite a fine collection of them, of which these are among the finest he had. Professor Maisch suggested that the correct scientific names of these specimens be ascertained through the Academy of Natural Sciences.

The Curator, Mr. Jos. W. England, presented on behalf of Mr. R. A. Hance, to the College Cabinet, 214 specimens of *fluid extracts*, all the officinal and a very large number of non-officinal; also a number of *solid extracts* from the laboratory of Messrs. McKeown, Bower and Ellis, of this city. Mr. England also exhibited a sample of *albolin*, a mild, white, odorless, non-rancidifying solid, melting between 110° and 130° F. It is made by McKesson & Robbins, of New York. Albolin is entirely destitute of odor and taste; and as its melting point is from six to twenty-six degrees Fahrenheit higher than the officinal petrolatum, it seems to be a purified or white petrolatum with a certain amount of paraffin melted with it. The makers define it to be a carefully refined product from a peculiar kind of petroleum, possessing properties which recommend it for various medicinal, pharmaceutical and toilet purposes.

A paper on *Linimentum Ammoniac* was read by Mr. Jos. W. England. The reading of the paper elicited a good deal of discussion, particularly as regards the liniment when made with linseed oil and mixtures containing it. Mr. England stated that he had made *linseed oil* with bisulphide of carbon, but that it required ten parts of absolute alcohol to dissolve it. Prof. Maisch asked if the oil had been made from seed ground by Mr. England, or from flaxseed meal as purchased. The commercial meal had been used. It is well known that the oil changes rapidly in ground seeds, especially flaxseed, this oil being of the class called drying oils. Mr. Moerk said that linseed oil made from freshly ground seed, with petroleum spirit of light gravity, required but five parts of absolute alcohol, and that from carbon bisulphide required about ten parts. Prof. Maisch stated that the yield of cold pressed flaxseed oil, as expressed by the late Fred. L. John, amounted to only about ten or twelve per cent.; a sample obtained from Mr. John many years ago was soluble in five parts of

absolute alcohol. At present, with the use of improved machinery, about 18 or 20 per cent. of oil was obtained by cold pressure, but whether this was wholly soluble in the same amount of alcohol, he had not ascertained. The total yield by hot pressure is from twenty-eight to thirty per cent. Mr. Thompson wished to know how cold pressed oil might be discriminated from that made by heat and pressure. It was stated that the former could be recognized by the alcohol test before alluded to, and by the mild odor and bland taste which are quite different from that made by heat and pressure. Mr. Thompson said the whole tenor of the paper just read and the consequent discussion showed that it was quite important that *linimentum ammoniæ* and similar preparations should be prepared extemporaneously for present need only. The registrar moved that the subject of linseed oil, cold and hot pressed, be referred to a committee of three, and it was recommended that Dr. A. W. Miller be placed on the committee, he having had a great deal of experience with oils; some years ago he had presented samples of cold-pressed linseed oil. It was mentioned that such an oil had great advantages over the ordinary flax-seed oil used by painters; and the registrar stated that he had been informed by veterinary surgeons that the cold pressed oil was the only article fit for use in their practice. The chair appointed on the committee Dr. Miller, and Messrs. Thompson and England. The paper of Mr. England was referred to the Committee on Publication.

Mr. C. S. Gallaher read a paper upon a *Crystalline Principle from Cimicifuga*, showing that crystals could be obtained, and the tests demonstrated them to be cane sugar. The paper was referred to the Committee on Publication.

Mr. F. X. Moerk read a paper upon a *Cancer Cure*. Prof. Maisch alluded to the large amount of arsenic found in this cure, which seems to have originated in Easton, Pa.; and read a letter from Dr. Pursell, of Bristol, Pa., giving the history of several cures of epithelioma which had come under his notice. The paper was referred to the committee.

Dr. C. B. Lowe alluded to the late Exhibition of the Horticultural Society, and called special attention to the crotons, which are of the same genus from which croton oil is obtained; the display of plants of the family of *Maranta* was also quite large, and the leaves were often marked in a peculiar manner, as though they had photographs upon them; a fine specimen of the *Lotus* plant was exhibited; also several species of *Nepenthes* and some leaves of the *Victoria regia*, about four and one-half feet in diameter, showing both upper and lower sides. Professor Maisch stated that the genus *Croton* comprised over four hundred different species, many of which were under cultivation; the handsomest display of crotons he had ever seen was ten years ago, in the Lieutenant-Governor's gardens at Toronto, where quite a number of different species were grown, many of them with beautifully variegated foliage.

Professor Maisch also exhibited a sample of *sarsaparilla*, from Messrs. Wm. R. Warner & Co., which had been offered as the Honduras variety, but really was a handsome specimen of Mexican, and it is evident that it was packed in the locality where it grew, as the binding root must have been fresh when put on; as far as could be seen it was free from the rhizome and portions of stem which usually accompany the Mexican variety. Another curiosity in the shape of a root was a sample of *manihotragora* roots, three in number, which had considerable likeness to the human form; it was highly esteemed

in former times in southern Europe, for supposed medicinal virtues, as was the ginseng of the Chinese, which sold at fabulous prices.

Mr. A. P. Brown exhibited a *Chinese medicine* put up by a Chinese druggist, according to a prescription; the medicine consisted of herbs, barks and portions of a lizard, all in coarse and very irregular fragments, and was used as a preventive and also as a cure for gonorrhœa.

Prof. Trimble showed a pair of *lizards*, as prepared by the Chinese for medicinal purposes, brought from San Francisco by Dr. Charles Schaffer, of this city; they are recommended for use to those who desire to have large families!!! The name, as nearly as could be ascertained by the Doctor, is cup-guy.¹

It was recommended that hereafter the museum be thrown open at an early hour, so that the students could remain from the quizzes till the meeting commenced.

There being no further business, a motion to adjourn was carried.

T. S. WIEGAND, Registrar.

EDITORIAL DEPARTMENT.

The last of stenocarpine or gleditschine.—After the editorial article, which appeared in our October number on pages 541 to 543, had been written, we observed that in several journals the name of the suspicious alkaloid had been changed from stenocarpine to gleditschine, and that the source of it was stated to be *Gleditschia triacanthos*, *Lin.* But we did not think it necessary to refer to this species, since, thereby, the doubtful character of the source was by no means cleared up, even if the tree should grow in Louisiana as plentifully as the legend of the discovery of the anæsthetic effects of the leaves would indicate.

The source of that wonderful alkaloid has at last been discovered, or rather unravelled, for we learn from Messrs. Parke, Davis & Co., that an investigation, at their laboratory, of a solution purporting to be a 2 per cent. solution of gleditschine or stenocarpine, which was supplied by Messrs. Lehn & Fink, of New York, has developed the fact that this solution, with which the experiments thus far recorded have been made, contains 6 per cent. of *cocaine* and a sulphate of a salt which further experiments is likely to prove to be atropine.

F. A. Thompson, Ph.C., also reports, after careful experiment with the leaves of *Gleditschia triacanthos*, from which gleditschine or stenocarpine is claimed to have been derived, that they contain only an infinitesimal per-

¹Mr. Stewart Culin, of Philadelphia, has kindly informed us that in the dialect of Canton, these lizards are called *kop kai*, and at Peking *koh kiai*, and that in China they are commonly thought to be a transformation of a swallow. They are extensively used by the Chinese practitioners here, the surface of the lizard being carefully scraped and the head removed, the remainder being minced and then made into a tea, usually with other drugs; they are regarded as a strengthening medicine and as an aphrodisiac, and are sold at from 40 to 50 cents per pair.—EDITOR.

centage of an amorphous alkaloid devoid of anæsthetic or mydriatic properties.

In addition to this it should be mentioned that a small quantity of the leaves have also been experimented with by Dr. B. H. Paul and A. J. Cownley, who report in the *Phar. Jour. and Trans.*, October 15, that they did not succeed in isolating from them any alkaloid, or obtaining from them a principle producing a numbing sensation like that caused by cocaine; and they come to the conclusion that, most probably, stenocarpine is a myth.

In the light of these facts it seems more than probable that the stenocarpine sensation should be classed with the hopeine fraud of malodorous memory, and that the physicians who have already published reports regarding gleditschine or stenocarpine have been the victims of a thinly disguised hoax.

The Mutual Relations of Physician and Pharmacist is the subject, for the best essay on which the *Pharmaceutical Era*, Detroit, offers a prize of \$50 in gold. The essay must not exceed 2000 words in length, and must reach the publishers on or before January 1st. next, the author's name to be enclosed with the manuscript on separate paper. All essays submitted are to be the property of the journal named, and to be published or not at the discretion of the editor. The essays will be submitted, anonymously, for the awarding of the prize, to a committee of five physicians and pharmacists. Anyone interested in the subject may compete for the prize.

The Pharmaceutical Examining Board for the State of Pennsylvania, announce that the ninety days allowed by the new pharmacy law for registration without examination, expire on November 18th, and that the Board has no power to extend the time. The secretary of the Board is H. B. Cochran, Lancaster, Pa.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

A Manual of Materia Medica, being a Guide to Materia Medica of the Vegetable and Animal Kingdoms; for the use of Students, Druggists, Pharmacists and Physicians. By John M. Maisch, *Phar. D.* etc. Third edition, with 257 illustrations. Philadelphia: Lea Brothers & Co., 1887. 12mo. Pp. 532.

For somewhat detailed reviews of the two preceding editions we refer our readers to the *AMER. JOUR. PHAR.*, 1882, p. 39, and 1885, p. 55; and in announcing the appearance of the third edition, merely quote from the preface the following which, in a measure, will show in what respects it differs from the previous ones: "The general arrangement, having proved its convenience and usefulness, has been left undisturbed; but the text has been carefully scrutinized, and wherever it seemed necessary or desirable, has been rendered more precise in the description of the physical and structural characteristics. New investigations, as far as they fall within the scope of the work, have been noted with more or less minute detail as their importance seemed to require, and fifteen new illustrations have been added. The number of indigenous plants which are locally employed for medicinal

purposes is very considerable; but, after much inquiry, few, if any, not previously noticed in the Manual, appear to enjoy a sufficiently extended use for admission, though several of the older remedies described may perhaps be of no greater general importance. New remedies of vegetable origin are frequently of an ephemeral character, failing to acquire an extensive application in medicine, or importance as articles of commerce. Owing to such considerations only a small number of drugs, like kava root, mallow flowers, ajowan fruit, the seeds of chaulmugra, cola and kombé, and lanolin, have been deemed of sufficient consequence for description in a manner similar to that adopted for pharmacopœial drugs; but an additional number has been noticed in connection with other drugs, for which they may be mistaken, like waras with kamala, mangosteen with bael, etc."

The Principles of Theoretical Chemistry, with special reference to the Constitution of Chemical Compounds. By Ira Remsen, Professor of Chemistry in the Johns Hopkins University. Third edition; enlarged and thoroughly revised. Philadelphia: Lea Brothers & Co., 1887, 12mo. pp. 318.

On the appearance of the first and second editions of this work in 1877 and 1883, we have commented on its excellence as a guide into the study of theoretical chemistry, and the same verdict must be given now that the third edition is before us, modified in various ways and considerably enlarged. Besides the new additions and modifications which are noticeable throughout the book, we observe a new introductory chapter, several chapters on matters pertaining to the subject of chemical affinity, and the chapter on valence, which has been rewritten and enlarged.

The value of theoretical chemistry is not a doubtful question; many of the most important discoveries have resulted from investigations into the constitution of chemical compounds, or as it is also expressed, into their structure. But numerous relations are still involved in uncertainty, and many patient investigations will be required before more light is thrown on such questions, when discoveries may be expected equal in importance to those that have resulted from the elaboration of theories, now pretty generally recognized. That the study of theoretical chemistry in the United States is being regarded with more favor than formerly, is a gratifying evidence of scientific progress, and in this sphere Professor Remsen's valuable work, we believe, has exerted a very salutary influence.

The Physician's Visiting List for 1888. Philadelphia: P. Blakiston, Son & Co. Price, for twenty-five patients per day or week, \$1; or interleaved, \$1.25.

This is the thirty-seventh year of its publication. As usual, the preliminary matter is well selected and conveniently arranged for reference. Larger sizes of this visiting list arranged for 50, 75 and 100 patients are likewise published.

China in America: A study in the social life of the Chinese in the eastern cities of the United States. By Stewart Culin, Philadelphia, 1887, pp. 16.

This interesting essay was read before the Section of Anthropology, American Association for the Advancement of Science, and is embellished with a fac-simile reproduction of a Chinese map of the Province of Kwantung, from two departments of which the Chinese laborers in the United States come.

The following reprints have been received :

The Estimation of Quinine by Kerner's Method. By E. A. Ruddiman, Ph.C.

A contribution from the School of Pharmacy of the University of Michigan; reprint from *The Pharmaceutical Era*.

Is an Apprentice in a Drug Store entitled to Receive Instruction in Practical Pharmacy from his Employer? By Ottmar Eberbach.

From Proceedings of the Michigan State Pharmaceutical Association.

The Cultivation of Cinchona in Bolivia. By H. H. Rusby, M.D.

From *Pharmaceutical Record*. The paper was read before the American Association for the Advancement of Science.

The Chemistry of Nitrogen Disclosed in the Constitution of the Alkaloids. By Prof. A. B. Prescott.

From Proceedings of the American Association for the Advancement of Science. This is an address made before the Section of Chemistry.

OBITUARY.

Spencer Fullerton Baird, L.L.D., died at Woods Hall, Mass., August 19. He was born at Reading, Pa., February 3, 1823, was educated at Dickinson College, in 1846 became Professor of Natural Sciences in that institution, in 1850 was appointed assistant secretary of the Smithsonian Institution, and after the death of Prof. Henry succeeded him as secretary of the institution and Director of the National Museum. He was the author of a number of works and of numerous papers on the fauna of North America.

Max Flückiger, M.D., son of Professor F. A. Flückiger, died suddenly in Strassburg, September 24. The deceased who was born in Bern, Switzerland, February 13, 1861, was an accomplished student, with the prospects before him of a bright career of usefulness.

Seth Caleb Johnson, Ph.G. Philadelphia College of Pharmacy, class 1886, died at Absecon, N. J., October 1st, at the age of 31 years.

THE AMERICAN
JOURNAL OF PHARMACY.

DECEMBER, 1887.

CHINESE DRUG STORES IN AMERICA.

BY STEWART CULIN.

Read before the Philadelphia College of Pharmacy at the Pharmaceutical Meeting, November 15, 1887.

Not the least interesting feature of the Chinese quarter in our American cities are the drug shops which these conservative people have established for the sale of their native drugs in connection with their general stores.

These shops reduplicate the herbalists' shops of Hong Kong, and their native villages. They are usually conducted by a separate company from that of the store with which they are associated, and their supply of drugs arranged on one side of the shop, apart from the other wares. The sign of the company, a green or black tablet with the felicitous name invariably selected for such enterprises, inscribed in gilded letters, is suspended within the shop.

The drugs, such as are frequently called for, are contained in boxes or drawers ranged in tiers behind the counter. These boxes are usually divided into four compartments, and their contents indicated by neatly written labels of red paper, or sometimes, in lieu of labels, a tablet is suspended in front of the shelves, upon which appears a plan of their multitudinous contents. Powders are kept in tin or brass boxes in a drawer beneath the counter; a series of bottles contain nuts and mineral substances; while poisons, and some of the more rare and valuable drugs, are dispensed from a locked case with glass doors. Piled high above the cases are innumerable packages, each with the name of its contents written on the projecting end, which constitute the reserve supply of drugs, or contain barks and herbs seldom called for by the practitioners here. Space will not permit any extended reference to the *materia medica* of China, of which almost a complete

collection may be found in the stores we have described. It is popularly known to us through the accounts of travelers, as grotesque and childish, composed of "dragons bones" and scorpions, snake skins and melon seeds, and substances selected more on account of their scarcity and curious origin than for any medicinal virtues they may possess. The results of such observations as have been made by competent foreign scholars are contained in transactions of learned societies and books generally inaccessible to American students, but they go far to show that many of their drugs are not without great value, a large number of them, in fact, nearly identical with those of our own pharmacopœia, and that many important discoveries have resulted from the centuries of experiment upon which their practice of medicine is founded.

Nearly all of the medicines in general use here, with a few important exceptions, are of vegetable origin and consist of nuts, berries, roots, barks and herbs. The subjoined list, furnished by a Chinese physician in Philadelphia, contains the names of the ten drugs he considers valuable, if not indispensable, and gives some idea of the substances actually employed in their practice:

正防黨 *Ching fong tong*. The root of a plant.

何首烏 *Ho Shau U*. Root of *Aconitum Japonicum*.¹ From Szechuen province.

大當歸 *Tai tong kwai*. Root of *Aralia edulis*.² From Szechuen province.

紅藥杞 *Hung kwo ki*. Fruit of wild *Berberis Lycium*.³ From Szechuen province.

川杜仲 *Ch'ün tò chung*. The outer bark of a tree. From Szechuen province.

杜松 *Pak k'í*. A kind of lung wort.⁴

川芎 *Ch'ün kung*. "Nodular masses consisting apparently of the rootstock of some umbelliferous plant allied to angelica."⁵ From Szechuen province.

¹ Daniel Hanbury, *Science Papers*, London, 1876, p. 258.

² *Ibid.*, p. 260.

³ *Catalogue of the Chinese Customs Collection at the International Exhibition, Philadelphia*, 1876. Shanghai, 1876, No. 3886.

⁴ S. Wells Williams. *A Tonic Dictionary of the Chinese Language*. Canton, 1856, p. 153.

⁵ Hanbury, p. 260.

苧草 *Kòm ts'ò*. Liquorice root.

淮山 *Wái shán*. The root of a water plant.

白朮 *Pák shut*. The root of *Atractylodes alba*.¹ From Szechuen province.

The medicines are all imported from China, either from Hong Kong or Canton, and reach here in their crude state, the herbs and barks in large pieces, and the tubers and roots usually entire. It is customary to cut the former in small pieces, and slice the latter in delicate segments, before placing them in the drawers and boxes for sale. A large cleaver, *yeúk ts'oi k'ap*, mounted with a hinge upon a slightly inclined table, is employed to chop the grasses and herbs in convenient lengths, while the tubers are sliced upon an instrument resembling a carpenter's plane, *yéuk p'ò*, inserted in a long bench upon which the operator sits, the pieces falling through upon a tray placed beneath. A canoe-shaped mortar of cast-iron, *yeúk shün*, is employed to reduce some of the more refractory nuts and minerals to powder. It stands upon four legs, and a heavy disk of iron is rolled backwards and forwards within it by means of a wooden axle to which the operator applies his feet, while his hands are free to perform other work.

The clerks who dispense the medicines have usually had some experience at home. They are paid from twenty-five to thirty dollars per month, with their board and lodging, the current wages among the Chinese here for unskilled labor; but their work is light, and they sometimes assist with the lottery drawings for which they receive additional compensation. They frequently act as bookkeepers, and, in common with the shop-keeping class, are brighter and better educated than the mass of the immigrants. Their knowledge of medicine is derived almost entirely from experience, no books on the subject being used or studied by them and the *Pún tso*, or Herbal, is not to be found in any of their shops.

The prescriptions furnished by the native doctors, which are usually written upon Chinese letter-paper and a foot in length, contain only a list of the names and quantities of the medicines required, with concise directions for their preparation, no date or signature being appended. Upon being presented to the clerk over the counter, he weighs out the ingredients, and places them separately upon a large sheet of paper, going over them carefully afterwards to prevent any possible mistake. A hand balance, *li tang*, is used, consisting of a

¹ Customs Collection. No. 4082.

decimally graduated, ivory rod, from one end of which a brass scale pan is suspended by silk threads. The smaller kind weigh from one *li* to five and one-half *léung*, or Chinese ounces,¹ and are remarkably accurate.

Various simple expedients are resorted to by the clerk in the preparation of the medicines. Some are powdered in the upright iron mortar, *chung hòm*, and others in the porcelain mortar, *lúi ún*; certain roots and seeds are roasted in a pan, while others are steeped for a few moments in Chinese rice spirits. The package of medicine is carried home to be boiled, and the infusion taken at one dose by the patient. Some *hak tsò*, Chinese prunes, are usually furnished to be eaten at the same time. The prescription, of which no record is kept, is returned with the medicine.

The practice of medicine by the Chinese doctors here is confined almost entirely to what is called by the Chinese *noi fo*, or internal medicine. *Ngoi fo*, "external practice" or surgery, which constitutes a distinct branch of their healing art, is little understood by them, and their patients seldom make greater demands upon them than for a cure for a cold, indigestion or headache. But slight as may be their ailments, the Chinese of our cities are constantly taking medicines. Well, they resort to prophylactics, or try to improve their digestion; ill, they take one prescription after another, and drink quantities of unpalatable tea every night, usually, upon their own testimony, to little advantage.

No less than four shops supply medicines to the little colony in Philadelphia, and day and night their clerks are busy, weighing and pounding and tying up packages for the relief of their suffering countrymen. Nor are the drugs regularly prescribed by their physicians the only medicine used by them; almost every shop furnishes an assortment of pills and teas compounded by Canton pharmacists.

First among these are the *Wai Shang Ün*, or "Life Preserving Pills," which are taken by both the sick and well on account of their supposed vitalizing properties. In common with many other Chinese pills they are enclosed in a shell of vegetable wax, upon which is stamped the name, with that of the makers, in vermilion and gold.

1	1	<i>li</i>	=	57.984	grains, Troy.
10	<i>li</i>	=	1 <i>fan</i>	=	5.7984 " "
10	<i>fan</i>	=	1 <i>ts'in</i>	=	57.984 " "
10	<i>ts'in</i>	=	1 <i>léung</i>	=	579.84 " "

One of these boluses—they are nearly an inch in diameter—is taken at a dose. The usual price for the best kind is one dollar apiece. They are said to be composed of *yan sham* (Manchurian ginseng), *luk yung* (deer's horns),¹ and other expensive drugs. A cheaper kind is entitled upon a printed advertisement, *Yan sham luk yung ning shan po shan ün*—(ginseng and deer's-horn pills for tranquilizing the spirits and strengthening the kidneys). These also purport to contain *yuk kwai*, a precious cinnamon, the bark of the *Cinnamomum Cassia* (?), one of their most highly valued drugs. That used by the Chinese pharmacists here is imported in boxes covered with raw silk, each containing one piece, about fourteen inches in length. The price varies with the quality, from two dollars and a half to five dollars for one *léung*.

Sü hòp ün (rose mallows pills), are taken to relieve flatulency; *king fung ün* are intended for children; *ying im ugán ün* (the well approved eye pills), are dissolved in water and used as an eye lotion; *Shan hau pak chuk ün* purport to be a remedy for a certain disease, and *Shan hau hung ün* (Divinely efficacious red pills), are taken as a prophylactic against the same complaint. Occult and magical properties are claimed for nearly all of these compounds, and they are not regarded with much favor by the regular physicians.

Several varieties of ginseng are sold in the shops. The American root, sold under the name of *yéung sham* (foreign ginseng), is the cheapest, the current price being 40 cents per *léung*. Next in value is *kat lam sham*, said to be obtained from Corea, costing 50 cents per *léung*. *Kò tai sham* (Corean ginseng), is the kind most used here, and costs from \$2.50 to \$3.50 per *léung*. *Yan sham*, Chinese or Manchurian ginseng, the most precious and famous drug of the Chinese pharmacopœia, is seldom, if ever, to be found in the stores. Occasionally one sees small roots purporting to be *yan sham* kept wrapped in raw cotton in tin boxes; but the enormous price asked for them, often from sixty to one hundred dollars for one *léung*, prevents their use except in extreme cases, or as a matter of luxurious extravagance.

In concluding these notes, we desire to call the attention of American students to the field afforded by these Chinese drug shops for the investigation and study of Chinese *materia medica*. Local observers

¹ Two deer's horns exposed in the window of a Chinese shop in Philadelphia are said by the proprietor to have cost ninety-five dollars for the pair.

in the Treaty Ports have made many observations ; the series of papers now in course of publication by Mr. Charles Ford, assisted by his able colleagues in *The China Review*, are a most valuable contribution ; but the subject is far from exhausted, and the student of historical medicine, who finds thus presented to him many of the drugs and methods of the mediæval leech, cannot fail to appreciate the light thrown by them upon the origin and development of the science of medicine in the western world. How far Europe has been indebted to China in this, as in so many of the useful arts, remains as yet almost a matter of conjecture.

POWDERED CAMPHOR.

BY JOSEPH W. ENGLAND, PH.G.

Read at the Pharmaceutical Meeting, November 15.

Amongst the older drugs medicinally employed we find that peculiar stearopten camphor not only retaining its hold upon medical favor as much as it did upon its introduction into practice several centuries ago, but steadily increasing in general and professional application year by year. Dissolved in alcoholic, ethereal, chloroformic or oleaginous liquids, it forms the basis of many stimulating liniments. Internally given, in the form of pill, powder or emulsion, it finds a still more varied sphere of usefulness.

Now, the form of pill is decidedly objectionable when the camphoraceous mass is hard, dissolves with difficulty in the gastric juice, and occasions nausea and pain, and these results are not unfrequently exhibited. Orfila states that when given in the solid form, it is capable of producing ulceration of the gastric mucous membrane.

The emulsion is very often used, and affords one of the best of methods ; presenting, as it does, the camphor in a non-granular, finely divided state, capable of most readily exhibiting its peculiar stimulating properties.

Concerning the powder, there are occasions when this form of administration is most desirable. Every pharmacist has, however, experienced the difficulty in keeping powders finely divided, which contain camphor as one of their ingredients, and numerous expedients have been suggested to make this solid retain its pulverulent condition, after it has once been made so. It is easy enough to reduce, by breaking down its tough texture with solvents ; but, on standing,

aggregation of the finely divided particles again takes place, with the formation of small, irregular, granular crystals, some of which, by the heat of the room where kept, sublime against the sides and top of the bottle, opposite the light.

Some years ago, Mr. Henry F. Fish recommended a five per cent. addition of magnesium carbonate, made by pouring an alcoholic solution of camphor into water containing suspended magnesium carbonate, collecting the precipitate on a filter, and drying. Independently of the increased cost, it has been found that such procedure merely retards and does not prevent subsequent crystallization. The same objection also exists against precipitating the tincture with water; triturating with an equal weight of sugar; adding precipitated calcium phosphate; grating and sifting, or subliming, with conduction of the vapor into large air chambers, and condensing. The products formed may be most excellent at first, but as far as the writer's experience goes, the secondary change always follows.

For some months past, a method has been pursued which has yielded the most satisfactory of results yet obtained, and a sample of the powder, made in the early part of last July, still retains its finely divided form, with no granulation of crystals whatever. The plan adopted is a very simple one, consisting, first, in reducing the stearopten to pulverulency in a mortar, with the aid of a small quantity of a solvent, such as, for example, alcohol or ether, triturating to thorough dryness, and then adding five per cent. of petrolatum, admixing well.

A sample of the powder, as thus made, is here presented for your inspection. You will observe that it is a finely divided yellowish-tinted powder; strongly characteristic in odor; quickly dissolving when placed on the tongue, with a very warm, pungently bitter taste, and showing all the other properties of the drug. The proportion of the unctuous paraffin solid present, harmless in itself, is too small to have any influence upon the dosage, and yet sufficiently large to prevent subsequent crystallization. On standing for a short time, moderate caking takes place, but no crystallization ensues. If a lump be now placed on the hand, and slight pressure applied, it readily breaks down into a fine, velvety powder. It is, therefore, admirably adapted for general use in powders despite its caking tendency, and is especially applicable in the extemporaneous preparation of camphor ointments or camphoraceous suppositories. It might also be employed in the manufacture of camphor containing catarrh-snuff powders.

EXTRACTUM LAPPÆ FLUIDUM.

Contribution from the Pharmaceutical Laboratory, Philadelphia College of Pharmacy.

BY EDWIN C. LESHER.

Read at the Pharmaceutical Meeting, November 15.

A series of experiments were tried to ascertain the best menstruum that would produce a clear percolate charged with the active properties of the drug. Alcohol and water employed in varying proportions were used. The result is as follows :

Burdock root, No. 60.....	8 oz. av.
Diluted alcohol, sufficient quantity for....	8 fl. oz.

Moisten the powder with 2 oz. av. of the diluted alcohol, and pack it firmly in a cylindrical percolator; then add enough diluted alcohol to saturate the powder and leave a stratum above it; when the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed gradually, adding diluted alcohol until the burdock root is exhausted. Reserve the first $6\frac{1}{2}$ fluid ounces of the percolate. By means of the still, distil off the remainder of the alcohol, and evaporate the residue to a soft extract; dissolve this in the reserved portion, and add enough diluted alcohol to make the fluid extract measure 8 fluid ounces. This affords a very dark wine-colored preparation, of a strong odor, remaining permanently clear, and possessing the full medical properties.

A second experiment was made with a menstruum composed of alcohol, 2 parts, and water, 1 part, 3 fluid ounces of the mixture being used for moistening 8 ounces of the drug in No. 20 powder. The percolation was conducted as in the first experiment, and the fluid extract was finished in the same manner.

The third experiment differed from the first, in using burdock root in No. 30 powder, and in moistening 8 ounces of this with 3 fluid ounces of diluted alcohol.

In making these fluid extracts the alcohol was recovered by the use of a still, and after having ascertained the specific gravity, which was found to be 0.870, it was easily converted into diluted alcohol by the following calculation: To find the quantity of water to be added, multiply the difference between the specific gravity of the liquid and the desired specific gravity of the mixture by the quantity of the

liquid, and divide the product by the difference between the desired specific gravity and that of the water to be mixed with it.

There is nothing more unsightly in the shop of a pharmacist than a bottle containing a liquid with a bulky precipitate. Not only is the appearance objectionable, but possibly the precipitated matter may contain the very substance which should be held in solution. In order to arrive at a satisfactory formula for fluid extract of burdock, it will be found necessary to take into consideration the principal constituents of the root. By comparing the color and properties of the three preparations, the first one, in which diluted alcohol as the menstruum was used, is by far superior to the others. The liquid is clear, and possesses the full properties of the drug.

There has been some demand created for this fluid extract, and it is sold largely in some sections. The dispensing pharmacist can very easily make it himself, and thus be not only sure of the quality, but also affect a saving in the cost. The root is now obtainable, costing about 15 or 20 cents per pound.

LINSEED OIL.

Read at the Philadelphia Meeting, November 15, 1887.

BY FRANK X. MOERK, PH.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

The interest which the subject of this paper excited at the last Pharmaceutical Meeting, led me to make some experiments with oils extracted from the ground seed by means of carbon disulphide and light petroleum ether. Ground flaxseed was purchased from a reliable firm in this city and used in the preparation of the oil by extraction with the above solvents.

Ten gm. were placed in a continuous extraction apparatus and exhausted with light petroleum ether (boiling point below 45° C.); the solution, on evaporation, left the oil—amounting to 33.80 per cent.—of a greenish-brown color, slight acid reaction, which is imparted to water on shaking, pleasant sweet taste. It is completely soluble in small quantities of carbon disulphide. In absolute alcohol it not only dissolves in five parts by weight, but mixes in all proportions. With an equal volume of 95 per cent. alcohol it forms a clear solution; on ad-

ding more it still remains clear until two volumes have been added, when it becomes turbid, and most of the oil separates on standing.

Ten gm. were similarly extracted with carbon disulphide, the yield being 33.50 per cent. The oil differed only from the above in color, which was of a yellowish-brown. It is well known that petroleum ether, in presence of fixed oils, will dissolve substances which ordinarily are insoluble in it, and it is very likely that a small quantity of chlorophyll was extracted by it and not by the carbon disulphide.

Both of the solvents acted at an elevated temperature and removed all of the fixed oil, as when reverse extractions were made, nothing additional was dissolved. The oils, therefore, were identical, and, after this point had been decided, the experiments were made only with oil extracted by means of petroleum ether.

The variability of commercial linseed oil, in regard to solubility in absolute alcohol, has been attributed to the supposed fact that the oil differed in composition when expressed in the cold or with the aid of heat. In cases where solvents were used it has been supposed that solvents of different composition, or boiling-point, removed only portions of the oil. If these views be correct, the first and last portions of oil extracted by a solvent should differ in regard to the solubility in absolute alcohol. That these portions and the total oil are completely and easily soluble in all proportions of absolute alcohol, clearly prove that the above views are erroneous, and that the pharmacopœial test is a valuable one for oil gotten by aid of a solvent or by cold expression, not followed by any other treatment.

In the manufacture of the oil it is customary to first roast the seed, in order to coagulate albuminous substances and to render insoluble the gum present. After the extraction of the oil this is bleached or decolorized by the use of sulphuric acid: and, here it was thought might be found the key to explain the differences shown by the commercial oil.

In the U. S. Dispensatory is given a process by Mr. C. Puscher, for the bleaching of flaxseed, rapeseed and poppyseed oils, which consists in adding to the oil two per cent. of a mixture of equal parts by weight of sulphuric acid and alcohol, allowing to stand until the oil becomes clear, which requires from twenty-four to forty-eight hours, and thoroughly washing with hot water.

To test the action of sulphuric acid upon oil—which was known to be pure, which dissolved in all proportions in absolute alcohol and

which formed a clear solution with an equal volume of 95 per cent. alcohol—some prepared by extraction with petroleum ether was taken and mixed with the requisite amount of the sulphuric acid and alcohol.

After fifteen minutes' contact a portion was thoroughly washed and tested; it had not been altered.

After standing five hours, another portion was tried, and while it showed no change with absolute alcohol, it did with 95 per cent. alcohol, with which it formed a clear solution until an equal volume had been added, when it became turbid. Testing again after forty-eight hours, the oil did dissolve in five parts of absolute alcohol, but did not dissolve in all proportions; on adding a few drops of 95 per cent. alcohol the oil formed with it a turbid mixture, and did not dissolve on adding an equal volume. These experiments show that the action of the sulphuric acid decreases its solubility in proportion as the contact is more prolonged, and explain why the commercial oil varies so greatly, some oils becoming decolorized more rapidly than others.

Another point in which this pure oil differs from the commercial is its ready saponification at the temperature of the water-bath with sodium carbonate. This is the only fixed oil from a number tried which saponified as above. The pure oil saponified with sodium hydrate, and the soap, decomposed by hydrochloric acid, yields acids of a firmer consistency than the acids gotten by analogous treatment of the commercial oil. The acids, when heated on a water-bath with a little water and barium carbonate, liberate carbon dioxide; and, if the barium soap be washed with water and extracted with 95 per cent. alcohol, a yellow acid solution is obtained which is free from barium, and, on evaporation, leaves an oily acid. The portion insoluble in alcohol, when decomposed by sulphuric acid, separates another acid of a firmer consistency and of a pale, yellow color. This forms the barium salt, in the cold, if the carbonate be mixed with it in presence of water. The commercial oil, treated in the same manner, appears to contain more of the liquid acid, although this has not been decided by actual quantitative analysis.

According to "Allen's Organic Commercial Analysis," Vol. II, linseed oil contains linoleic acid $C_{16}H_{23}O_2$, having a saponification equivalent of 264.7. Allen claims the presence of a higher homologue—homolinoleic acid, $C_{18}H_{32}O_2$ —the claim basing on the fact that the saponification equivalent of linseed-oil varies between 287 and 300;

the equivalent of this acid being 292·7, and thus it would compose almost entirely the acid present in the oil as glyceride.

In the last number of the *Ber. d. D. Chem. Ges.*, page 2735, is an article by Messrs. Norton and Richardson, of Boston, in which is stated "that in drying linoleic acid in an atmosphere of hydrogen at 100°C., we found it impossible to obtain a constant weight; after sixty-eight hours' drying, 20·36 per cent. of the acid taken had been volatilized, and the residue was still losing. No decomposition had taken place, as was found by analysis. Convinced that linoleic acid was volatile, we succeeded in distilling it at a temperature of 290°C., and a pressure of 89 mm. The distillate, amounting to 75 per cent. of the acid present in the oil, was a colorless liquid, had a specific gravity 0·9108 at 15° C., and the formula, $C_{20}H_{36}O_2$, agreeing with the vapor density which we found to be 153. The residue has not yet been examined."

The saponification equivalent of the glyceride of this acid— $C_{20}H_{36}O_2$ —is 320·7; higher than the equivalent of linseed-oil (287 to 300); so it is evident the non-volatile acid present, amounting to 25 per cent., must have a smaller equivalent, which can not be above 240, and which would correspond to an acid of the same series containing fourteen carbon atoms, or $C_{14}H_{24}O_2$. The volatile acid of Messrs. Norton and Richardson corresponds to the acid which I found does not saponify with barium carbonate; while the acid, forming a barium salt, will be found in the residue from their distillation of the volatile acid.

As opportunity offers, I will isolate this acid and establish its formula by ultimate analysis.

A Mercurial Potash Soap as a Sorbefacient.—Svetukhin (*Russk. Medits.*; *N. Y. Med. Jour.*, Aug. 27, 1887), finds a preparation termed *sapo kalinus hydrargyrosus*, made by mixing metallic mercury, mercurial ointment, caustic potash, and olive-oil in certain proportions—the resulting soap containing a third of its weight of mercury—an advantageous application for promoting the absorption of pleuritic effusion. It is said to be more easily rubbed in than mercurial ointment, less irritating to the skin, and not so rapidly productive of stomatitis. From half a drachm to a drachm is agitated with hot water, so as to form a good froth, and lightly rubbed into the skin. In cases of simple watery effusion, an effect may be detected after from six to ten inunctions, and after twenty the water is usually found to have wholly disappeared.

EXAMINATION OF COMMERCIAL SAMPLES OF WOOD ALCOHOL.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

BY WILLIAM H. CLARK.

Read at the Pharmaceutical Meeting, November 15.

Three samples were taken, and numbered 1, 2 and 3.

The odor of Nos. 1 and 2 was unobjectionable; that of No. 3, slightly empyreumatic.

The specific gravity of No. 1 at 20°C., was.....	.7962
“ “ “ No. 2 “ “ “ .....	.8136
“ “ “ No. 3 “ “ “ .....	.8049
No. 1 commenced to boil at 61°C., was constant at 68°.	
No. 2 “ “ “ 64°C., “ “ “ 68°.	
No. 3 “ “ “ 64°C., “ “ “ 68°.	

On adding 10 cc. of saturated solution calcium chloride to 5 cc. of each, no layer separated, showing absence of large quantities of acetone.

I made a quantitative estimation of acetone, by the method recommended by A. H. Allen, in his “Commercial Organic Analysis”: To 1 cc. of wood alcohol, add 10 cc. of a solution of caustic soda (80 grams to the liter), agitate, and add 5 cc. of a solution containing 254 grams of iodine and 332 grams of potassium iodide to the liter. Agitate, and dissolve the iodoform, which separates by shaking with ether free from alcohol. Separate the ethereal layer, evaporate at the ordinary temperature with diminished pressure, and weigh the iodoform; 394 parts iodoform correspond to 58 of acetone.

The samples under consideration gave the following results:

No. 1 contained 2.3 per cent. acetone.	
No. 2 “ 2.73 “ “	
No. 3 “ 2.70 “ “	

I found that a further addition of the iodine solution to the liquids, previously treated, produced an additional quantity of iodoform. I added an excess, and estimated the acetone in the same manner as before:

No. 1 gave an addition of 0.28 per cent. acetone=2.58 per cent. total.	
No. 2 “ “ “ 1.42 “ “ =4.15 “ “	
No. 3 “ “ “ 1.27 “ “ =3.97 “ “	

The specific gravity of absolute methyl alcohol is given by various authorities as .796 to .798, at 20°C.; but the boiling point is stated to be from 54.6° to 67.6°.

The results of the above samples show that commercial wood alcohol comes very close to the requirements.

No. 1 was represented to contain 97 to 99 per cent. of absolute alcohol; No. 2, 96 per cent., and the percentage strength of No. 3 was not given.

No. 1 cost \$1.70 per gallon; No. 2, \$1.65; No. 3, \$1.45. The price for five-gallon lots was a few cents less in each case.

As a cheap solvent in place of grain alcohol for commercial and scientific uses, this alcohol, as now obtainable in the market, promises to take an important position; and it is evident that if sanctioned by the United States Pharmacopœia, it might be used in many pharmaceutical processes, not, however, as an ingredient of any preparation to be administered internally while there is any question about the effects of it on the human system. It also becomes necessary with this improved solvent that pharmacists see that it is not improperly used. More exact processes, than now exist, are desirable for its detection when employed as a solvent, especially if used with the ordinary alcohol in the manufacture of tinctures and fluid extracts.

SODIUM SILICO-FLUORIDE.

By FRANK H. ROSENGARTEN.

Read at the Pharmaceutical Meeting, November 15.

At the last meeting of the British Association for the Advancement of Science, held in Birmingham, Mr. W. Thomson read a paper on some experiments he had made as to the antiseptic properties of some of the fluorine compounds. He had previously been engaged in endeavoring to find some substance which would act as a powerful antiseptic, which was not volatile, and which was not destroyed by oxidation. He experimented, on flour paste and on meat chopped into small pieces and mixed with water, on a very large number of chemical compounds, and found that those which had the most remarkable antiseptic properties were the compounds of fluorine, hydrofluoric acid, and the acid and neutral fluorides of sodium, potassium and ammonium, and the fluosilicates of those bases. Of these compounds he found fluosilicate of sodium the one which, for general purposes of an antiseptic, was, perhaps, the best suited. This salt is not poisonous, has no smell, and is sparingly soluble in water. It has only a very slightly saline taste, and might, therefore, be employed

for preserving food without communicating any taste to it. Many experiments had been made with it for surgical purposes.

A saturated solution, which contained 0.61 per cent., was not irritating to wounds, whilst it possessed greater antiseptic power for animal tissues than one part of perchloride of mercury in 1000 of water, which is a stronger solution than could be employed for surgical purposes without producing poisonous effects. The paper attracted much attention, the opinion expressed being that an apparently important discovery had been made.

At the request of Dr. Thomas G. Morton, surgeon of the Pennsylvania Hospital, I have prepared some fluosilicate of sodium for his use, and now show the salt to the College as a novelty not yet completely exploited. No doubt Dr. Morton will soon report on its antiseptic properties, though necessarily such results as pass the critical tests of surgery require extended time for observation. The salt is made by generating hydrofluosilicic acid, passing it into water, and then saturating the liquid with carbonate of sodium. There are some few little inconveniences in its preparation, and care must be observed in the proper proportions of the materials used in the generation of the acid, as an excess of hydrofluoric acid is dangerous to the operator.

Should this salt prove to be all that has been said of it, no doubt the surgeon will gladly welcome it as a substitute for the various antiseptics so invaluable in the healing art. The use of iodoform and corrosive sublimate, carbolic acid, and the various compounds brought forward would be lessened, and the disagreeable surroundings accompanying them be avoided.

SEPTEMBER 15th, 1887, 17th and Fitzwater streets.

The Prevention and Treatment of Fly Bites.—Mylius, of Leipzig, has found that flies have a most acute sense of smell, and that the irritation of their bites is caused by an acid lodged in the wound by the sting. After a long series of experiments with ointments and perfumes, he failed to find a satisfactory agent for preventing fly bites, which could be conveniently used with children. As a means of treatment Mylius has prepared pencils of ammonium carbonate, camphor, and menthol which can be instantly applied after a bite. Occasional cases were observed in which the sting had entered the lymphatics producing more severe infection. Such cases may be treated by cold compresses saturated with equal parts of dilute carbolic acid solution and lead water, to which is added 10 per cent. spirit of camphor.—*Deutsche medicinische Wochenschrift; Med. News*, September 3, 1887.

COMPARISON OF VEGETABLE WITH ANIMAL GLYCERIN.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

BY WILLIAM H. CLARK.

Read at the Pharmaceutical Meeting, November 15, 1887.

The best representative of each class was taken and subjected to the following tests: Others were applied, but they were mostly of a confirmatory character:

TESTS.	VEGETABLE GLYCERIN.	ANIMAL GLYCERIN.
<i>U. S. P. tests:</i>		
Tests as to physical properties	Conforms to requirements,	Conforms to requirements.
Chemical tests,	Conforms to requirements,	Conforms to requirements.
		(Stain left in porcelain capsule on ignition slightly darker than that left by vegetable glycerin.)
Reaction,	Neutral.	Neutral.
Specific gravity at 15° C., .	1.2585=97% absolute glycerol	1.257=96.5% absolute glycerol.
<i>Other tests:</i>		
Neutral sol. silver nitrate. (White ppt., blackening on standing, indicates acrolein and formic and butyric acids).	No immediate change. On standing 24 hours, deposited a very slight, black precipitate.	No immediate change. On standing 24 hours, deposited slightly heavier black precipitate.
Ammonio-nitrate of silver. (Test for formic acid.)	No change at end of half hour. On raising to 100° C. a silver mirror formed on sides of test tube.	No change at end of half hour. Silver mirror formed on raising to 100° C.
Nitrogen peroxide, (Test for higher fatty acids).	Slight flocculent ppt. trace.	Slight flocculent ppt. trace.
Basic plumbic acetate, . . (Test for rosin).	No reaction.	No reaction.
<i>Weight:</i>		
Of contents of 1 lb. bottle	15 oz. av. 357 gr.	16 oz. av. 352 gr. { difference of nearly one ounce
<i>Cost:</i>		
Of 1 lb. bottle,	95 cents.	75 cents—difference of 20 cents per bottle.
Actual cost per pound of glycerin,	98.8 cents.	71.4 cents—difference of 27.4 cents per pound.

To ascertain the weight, the wrappers were removed, and the bottle and contents weighed. The glycerin was then emptied out, the bottles washed and dried, and the weight of the bottle deducted. Both glycerins complying with the United States Pharmacopœia requirements and not differing materially even on extreme tests, it is difficult to see why the vegetable glycerin is worth twenty-seven cents per pound more than animal glycerin.

LABORATORY NOTES.

Abstracts from Theses.

Reduced Iron.—Ten commercial samples of ferrum reductum were examined as to their purity by Orville S. Creighton, Ph.G. Nos. 3 and 4 were of American, No. 7 of German, and No. 8 of French manufacture; the remaining samples were obtained from retail and wholesale stores, but the names of the manufacturers were not ascertained. In each case the color was noted; the pharmacopœial test with iodine and starch paste was applied; the samples were treated with dilute sulphuric acid to ascertain their solubility and examine the odor of the gas evolved; the gas resulting from treatment with dilute hydrochloric acid was passed through solutions of cadmium sulphate and silver nitrate; and the solution of each sample in excess of hydrochloric acid was tested for arsenic by boiling with bright copper foil (Reinsch's test). The results tabulated are as follows:

	Color.	Iodine test.		Dilute H ₂ SO ₄ .		Dilute HCl.		Reinsch's test.
		Filtrate.	Starch paste.	Sol'bty	Gas.	Cd. sol.	Ag. sol.	
1	black	red	blue	residue	nearly odorless.	clear	darkened	decided trace
2	"	"	"	"	"	"	"	" trace
3	greyish-black	pale red	light blue	"	odorless	"	slight	slight trace
4	"	"	"	"	"	"	clear	none
5	black	red	blue	"	n. odorless	"	darkened	strong reaction
6	greyish-black	pale red	light blue	"	odorless	"	clear	none
7	"	tinted	not blue	"	"	"	"	"
8	black and red	dark red	blue	"	n. odorless	trace of S.	darkened	decided trace
9	greyish-black	tinted	not blue	"	odorless	clear	clear	none
10	"	red	blue	"	n. odorless	"	darkened	decided trace

Adonidin has been prepared by Wm. D. Porter, Ph.G., by a slight modification of Cervello's process (see AMER. JOUR. PHAR., 1882, p. 497). The herb of *Adonis vernalis*, Lin., yielded on distillation a minute quantity of greenish volatile oil, having a faint acid reaction; by treatment of the drug with ether the amount of volatile oil was estimated at about 0.05 per cent. The glucoside was prepared from the tincture made with diluted alcohol by precipitating with basic lead acetate, then with sodium carbonate, and the filtrate with tannin; this last precipitate was mixed with oxide of lead, the mixture dried, exhausted with alcohol, and this solution concentrated and precipitated

with ether. The coloring matter was not entirely removed, and the product was yellowish and had the properties described by Cervello.

Digitalis and its preparations.—With the view of ascertaining their quality, Lewis A. Crull, Ph.G., examined preparations made from German digitalis leaves. Using 100 gm. of the leaves and following the pharmacopœial process of 1870, he obtained 2.5 per cent.¹ of digitalin; the abstract yielded 2.35 per cent., the extract 2.25 per cent., the fluid extract 2.5 per cent. and the tincture 0.4 per cent. of digitalin. Six commercial fluid extracts varied in specific gravity between 1.014 and .956, and yielded from 19.7 to 2.5 per cent. of digitalin.

Linseed oil.—Six samples, of which No. 1 had been prepared by means of benzin, were examined by Reinhold C. Werner, Ph.G.; their specific gravity and solubility in absolute alcohol was ascertained; likewise the effect of nitric acid and of warming with chloride of zinc.

	Soluble in		Color with		Effect of nitric acid.			
	Sp. g.	abs. alcohol.	Zn.	Cl. ₂				
1	.930	4.98 parts	green		red-brown and effervescence			
2	.928	5.00 "	greenish-yellow		" " "			
3	.930	5.20 "	"	"	dark "	"	"	
4	.930	5.30 "	"	"	dirty "	"	"	with heat
5	.930	5.10 "	"	"	reddish "	"	"	" "
6	.929	5.15 "	yellowish-green		red-brown	"	"	" "

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for THE AMERICAN JOURNAL OF PHARMACY.

NATURAL FERRUGINOUS WINE.—M. Sambuc (*Jour. de Pharm. et de Chim.*, October 15, 1887) having had occasion to analyze a wine of Seyne (Var), found it to contain a larger quantity of iron than is usually found in wines; sufficient, in fact, to constitute it a veritable ferruginous wine. He states, by the way, that the vine comes from American stock, and is known as the "Jacquez." The proportion of peroxide of iron ordinarily found in wine is from one to two cgm. per litre. Of the wines analyzed by M. Filhol, those richest in iron contained but three cgm. The wine referred to by M. Sambuc contained eleven cgm. The writer thinks that if it preserves its ferruginous richness during future crops it will rise to a high rank as a thera-

¹ This is about twice the amount obtained by other investigators.—[Editor.]

peutic agent. It seems likely to retain its qualities, not only on account of the presence of iron in the schistous soil in which it is grown, but from the richness of the Jacquez wine in coloring matter and œnocyanin. (According to Gauthier iron becomes fixed in wine under the form of œnocyanin). A natural ferruginous wine presents, for medical use—so says M. Sambuc—the important advantage of being in a condition favorable to its assimilation.

THUJA OCCIDENTALIS.—Pointed condylomata—according to a recent discoverer writing in the *Prat. Méd.*—shrivel and fall off in two or three days if painted with the tincture of *thuja occidentalis*. The remedy is said to be preferable to all others where excision cannot be made. In the *Bull. Com.*, October, “E. F.” finds that *Thuja articulata* was used thirty years ago for this purpose, and wonders why it has fallen into desuetude.

MYROBALANUS, the fruit of several species of *Terminalia*—an ancient remedy for intestinal affections, though long since disused in European countries—is receiving some attention of late on account of articles concerning it published in the *Union Pharm.*, September, October, 1887, by Dr. Apéry, of Constantinople. He calls it “an heroic remedy against diarrhœa,” and tells us that Dr. Ahmed Pacha prescribes it with great success. The pharmacists of the East sell it in large quantities under the name of Kara-halilé, or Indicher. The doctor’s investigations were made upon *M. nigrae*, s. *indicae*, that variety being “the most energetic and having the greatest vogue.” He found no alkaloid, but ascertained the presence of a green oleo-resinous substance which he believes to have an influence upon digestion and bile-secretion. This, together with tannin, which acts upon the intestines, leads the doctor to place the substance among the nutritive tonics and stimulants. A large number of doctors, who were led by him to test the substance, found it very effective in acute diarrhœas of the aged and in infants, as also in intestinal catarrh in tuberculous patients. They also found it efficacious in hemorrhages, hemorrhoids and albuminuria. The doctor believes it to be the best remedy now used in the dysenteries, and acute and chronic choleric diarrhœas, which decimate the people of the Orient. The dose is from four to twelve pills, whose size is not given. However useful myrobalanus may yet become as a medicine, it contains so enormous a quantity of tannin that a practical man reading these articles would be inclined to predict for it a still more brilliant success in the manufacture of

writing fluids. Indeed, the investigator remarks: "It also makes a beautiful black ink, more stable than that from nut-galls."

SPARTEINE IN CARDIAC AFFECTIONS.—Malowsky (*Rouss. Med.*, No. 13, 1887; *Bull. Gén. de Thérap.*, Oct. 30), has tested the medicament in three cardiac cases during the period of non-compensation. His conclusions are: That in moderate doses it stimulates cardiac activity, gives fullness to the pulse, and diminishes (by a few beats only) the number of pulsations; that it acts rapidly; that the rhythm does not become entirely regular; that an increased quantity of urine is eliminated, and that the medicament neither accumulates nor causes adventitious symptoms. Doses: one to three cgm. per dose, or ten cgm. per diem, of Merck's preparation.

MORPHINE IN THE VISCERA.—At the Académie de Médecine, Oct. 18, Dr. Ball described a case of death in a morphinomaniac, from whom his habitual dose of two gm. per diem was gradually withdrawn during forty-two days, and who seemed to be doing well. It appears that twelve days after the suppression he was seized with a dyspnœa which a resumption of the drug proved powerless to combat. The autopsy revealed no organic lesions, but the nervous centres—spleen, kidneys and liver—contained traces of the drug, and this after twelve days of total abstinence, and after it had ceased to show in the urine. Prof. Ball thought that morphine thus stored up might explain the troubles which sometimes appear in morphinomaniacs a long time after the cessation of the habit.

BROMHYDRATE OF HYOSCINE.—In *Nouv. Remèdes* of Nov. 8th, 1887, Dr. Hugenschmidt gives the results of trials of this remedy in his private practice. He used a solution of bromhyd. hyoscine, five cgm.; distilled water, thirty gm. Of this, six drops diluted with water and ingested, produced at the end of a half hour: visual troubles; a sensation of torsion in the ocular globes; dryness of the mouth and throat, and dilatation of the pupil. In one hour there was a sense of general fatigue, followed by a deep sleep with irregular respiration. During this time the pulse fell from seventy-two to forty-eight, and he observed in all his trials that the pulse constantly fell to forty-five or fifty. The sphygmograph indicated great augmentation of arterial tension, but a notable irregularity of heart beat was present. Five or six drops upon the tongue produced the same symptoms, with nausea added, but no vomiting. Two drops in the eye dilated the pupil completely in five minutes, with loss of accommo-

dation. Thirty-six hours afterward the pupil commenced to contract; accommodation was established on the third day, but dilatation did not end until the fifth or sixth. He noted that in dilatation, after *ingestion*, the right pupil was much more dilated than the left. Bromhydrate of hyosine, in doses of one-quarter to one-half mgm. as a potion or hypodermic injection, gave excellent results in insomnia caused by mental strain (*surmenage*), and in pytalism.

FORMULÆ FOR IODOL (as used by Professor Trousseau) are given in the *Union Méd.* An *ointment* is made with equal parts of iodol and petrolatum; and a *solution* (for external use) is composed of iodol, 1 gm.; alcohol, 15 gm.; glycerin, 35 gm. Iodol is said to contain 80 to 90 per cent. of iodine, and possesses the advantages of iodoform without its odor. It is thought to be excellent as a dressing in ulcerative cancer; and in obstinate ulcers is superior to iodoform in anæsthetic and antiseptic properties. Dr. Trousseau has said to have had good results from it in ocular therapeutics, to wit: blepharites with ulceration; scrofulous or lymphatic affections of the conjunctiva; granular or phlyctenular conjunctivites; sluggish ulcerations of the cornea, and maladies of the lachrymal passages. See also AM. JOUR. PHAR., 1887, p. 461.

PHENIC ACID MEASURED BY DROPPERS.—M. Fleury (*J. de Ph. et de Ch.*) finds that for small quantities of the diluted mixture a correct dropper is much more accurate than a scale. He says also that the use of 95 per cent. alcohol as a diluent gives rise to great variations in the strength and character of the mixture. He uses a solution of equal parts by weight of acid and of alcohol of 60 per cent. M. Fleury adopts this because solutions of phenic acid and strong alcohol are volatile and would soon possess a disproportionate amount of acid; and, finally, the influence of temperature upon the weight and volume of the drops is increased in proportion to the amount of alcohol contained in them.

NAPHTOL: REACTIONS AND SOLUBILITY.—In the *Archives de Pharm.*, November 5, 1887, M. Desesquelle, a Parisian pharmacist, makes some strictures upon current opinions concerning β naphtol. "German chemists," he writes, "say that β naphtol dissolves in about 1000 parts of cold water and 75 parts of boiling water; Andouard (*Traité de Pharm.*, 1886) says that it dissolves in 550 parts of cold water. I find that both writers exaggerate the solubility of naphtol. It requires about 5000 parts of distilled water at $+18^{\circ}$ to dissolve

it; and it dissolves very slowly and only after prolonged agitation. A litre of water, therefore, takes up only about 20 cgm. of naphthol. To the reactions given by the German chemists, the following," says the writer, "should be added: potash, soda, and certain alkaline salts give the aqueous solution of β naphthol the same violet fluorescence as ammonia; this disappears on the addition of an acid. 2. Chloride of lime in solution gives a yellowish tint; but the solution must be added drop by drop. 3. A mixture of concentrated sulphuric and nitric acids determines a beautiful rose color, lasting for a few seconds; it then passes to a 'red currant' color, which deepens to a purplish-red and changes with alkalis to a yellowish color. 4. Nitric acid, charged with nitrous vapors, gives a rose color, which gradually passes to yellow. 5. Hypobromite of soda gives, like chloride of lime, a yellow color, which an excess of the reagent causes to disappear. 6. Bromine water and chlorine water give a white precipitate. β naphthol often has a rose tint, which it holds pronouncedly in its alcoholic solution. It is slightly soluble in glycerin and liquid paraffin.

CHLORIDE OF METHYL FOR LOCAL ANÆSTHESIA.—At a sitting of the Soc. de Thérap., June 22 (*Prog. Méd.*, Oct. 15, 1887), Dr. Bailly, who uses the actual cautery largely for certain manifestations of hyarthrosis, tuberculosis and scrofulosis, stated that in a search for the best local anæsthetic he had used ice and salt, cocaine, with and without phenic acid, etc., but found them all inferior to the chloride of methyl spray as used by Debove. As soon as the skin becomes whitened, the spray should be discontinued and the cauterizations commenced at once. These are effected without pain.

THE TERPIN ELIXIR proposed a year ago by P. Vigier, being unstable on account of the crystallization of the sugar contained in it, that pharmacist proposes (*L'Union Pharm.*, Oct.) the following: Terpin, 50 cgm.; glycerin, alcohol 95 per cent., and honey, of each 7 gm.; vanillin, 2 mgm., for one tablespoonful.

PEDICULI AND THEIR EGGS are easily destroyed, so says M. Nartanian, a Constantinople pharmacist, by the use of a single application of the following preparation, which is rubbed upon the affected part with a bit of woolen: salicylic acid, 2 to 3 gm.; toilet vinegar, 25 gm.; alcohol at 80 per cent., 75 gm. The mixture is not toxic, and does not stain linen fabrics.

ABSORPTION OF MERCURY.—Ferrari and Asmondo (*Gaz. d. Osp.*;

Archives de Phar., Nov. 5, 1887), after researches made with minute precautions, have concluded that the skin does not absorb metallic mercury, although it may take up its salts. The mercury of inunctions, so they believe, becomes volatilized, and is absorbed through the respiratory organs.

FLUORESCENCES OF MANGANESE AND BISMUTH.¹

BY L. DE BOISBAUDRAN.

The author has continued his researches, and has examined the fluorescences of a mixture of two solid solvents behaving towards one another as moderately active substances, and a third substance strongly fluorescent with one of the solvents only, as represented by a mixture of cadmium sulphate (100 parts), bismuth sulphate (10 parts), and calcium sulphate. With a proportion of calcium sulphate not exceeding 14.8 per cent., the calcium cadmium fluorescence is prevented by the presence of bismuth, although the calcium bismuth fluorescence is not visible. When the quantity of calcium sulphate exceeds 16.1 per cent., the calcium bismuth fluorescence becomes visible, and increases in brilliancy with the proportion of calcium sulphate.

The author has also investigated the properties of a mixture of two solid solvents, the first of which (α) behaves towards the second (β) as a moderately active substance, and two active substances, one of which fluoresces with both solvents, and the other with only one of them. These conditions are fulfilled by a mixture of calcium, cadmium, bismuth and manganese sulphates. With an excess of calcium sulphate the calcium manganese fluorescence is strongest, the calcium bismuth fluorescence much weaker, and the cadmium manganese fluorescence is not visible. With an excess of cadmium sulphate, the cadmium manganese fluorescence is predominant, the calcium manganese fluorescence is also visible, but the calcium bismuth fluorescence cannot be recognized.

The author's experiments lead to the following general conclusions: A substance may show strong fluorescence when disseminated through another substance, and yet show no fluorescence with a third substance closely analogous to the second. A substance may fluoresce

¹ *Compt. rend.*, 105, 45-48 and 206-208. Reprinted from *Jour. Chem. Soc.*, November.

strongly with one compound of a metal and not at all with another compound of the same metal; or it may show fluorescence of a different character in the second case. Strongly colored substances prevent the fluorescence of active substances by reason of their strong absorptive power. A substance may behave as a solvent to one active substance; and also behave as a more or less active substance itself when mixed with a third substance. When two active substances co-exist in the same solvent their individual fluorescences are reduced in intensity, but their spectral character is not altered. Two more or less active substances in the same solvent may, however, neutralize one another. A substance which is active under certain conditions, but is inert when mixed with a particular solvent, may yet reduce the effect of a substance which is usually active with this solvent. Fluorescence in a given solvent seems as a rule to diminish on the addition of a second solvent which is not so effective with the active substance as the first solvent, but in some cases this effect is very slight.

An active substance generally produces a double fluorescence with a mixture of two active solvents, but with certain proportions one of the fluorescences diminishes in a greater ratio than the quantity of the solvent which produces it. With one active substance, and equivalent quantities of two effective solvents, the two fluorescences usually are equal in intensity, but the contrary is observed in certain cases. If two substances are unequally active with a given solvent, and the ratio of the two is kept constant whilst the proportion of the solvent is gradually increased, it is possible in some cases to observe successively (1) the effect of the less active body alone, (2) the coexistence of the two effects with increasing predominance of the effect of the more active substance. When the proportion of the more active substance is increased, its effect alone is observed whatever the nature of the solvent. Certain fluorescences which are masked by others can be seen when the tube is heated, or by observing immediately after the cessation of the electrical discharge, or by modifying the strength of the discharge.

Cocaine with Lanolin.—Ernest Wende finds lanolin a most valuable base for cocaine applications. In cases of burns and scalds he has had excellent results from a four per cent. application which both relieves the pain and protects the surface from the air.—*Med. Press ; St. Louis Courier of Med.*, July, 1887.

GOLD SULPHIDES.¹

BY L. HOFFMANN AND G. KRÜSS.

The statements given in various text-books concerning the sulphides of gold are very conflicting, compounds Au_2S , Au_2S_2 , and Au_2S_3 , being variously given. The sulphide Au_2S_2 is perhaps usually accepted, the existence of the other two very often disputed. These conclusions are, however, by no means justified. Berzelius believed he obtained Au_2S by passing hydrogen sulphide into a boiling solution of auric chloride. Levöl, on the other hand, states that under these conditions free gold is alone deposited. The authors find that Levöl's statement is correct, if care is taken to keep the temperature of the whole solution at 100° . If local cooling takes place the precipitate contains varying proportions of combined sulphur, but no definite compound can be obtained. In all their experiments the authors washed the precipitated sulphide by decantation with water, alcohol, ether, and carbon bisulphide successively. They found that the free sulphur was retained very firmly, and could not be completely removed by washing on the filter.

When hydrogen sulphide was passed through a solution of potassium aurocyanide, no apparent change took place, but when excess of hydrochloric acid was added, and the whole heated, *aurous sulphide*, Au_2S , was precipitated as a steel-gray precipitate. This was carefully washed as above, and obtained in a dry state as a brownish-black powder of constant composition, corresponding with the above formula. When freshly precipitated, it dissolves in water to a brown solution. It is therefore necessary in purification to wash it with water containing hydrochloric acid, in which it is not soluble. When once dried, it is no longer soluble in water. It is not decomposed when boiled with dilute hydrochloric or sulphuric acids. Aqua regia, chlorous oxide, and other oxidizing agents, oxidize it easily. Bromine-water slowly dissolves it, with formation of AuBr_3 and sulphuric acid. Alkaline monosulphides dissolve it but slowly and slightly, polysulphides rapidly and completely, with the formation of green solutions of sulpho-salts. Caustic potash solution does not attack it even at 100° , whereas the compound Au_2S_2 is, under like conditions, decomposed into gold, potassium gold sulphide, and potassium gold

¹ *Ber. d. D. Ch. Ges.*, 1887, p. 2369; reprinted from *Jour. Chem. Soc.*, November.

oxide. Potassium cyanide dissolves it readily, and the sulphide is reprecipitated by boiling the solution with excess of hydrochloric acid. This reaction gives a good means of purifying the sulphide from free sulphur, as a slightly warmed solution of potassium cyanide dissolves the former and not the latter. When heated in a tube, part of the sulphur distils off, and part passes off as sulphurous anhydride. The compound is completely decomposed at 240° , and ignites in oxygen at a low temperature. When heated in a stream of hydrogen, hydrogen sulphide is formed; but in a stream of hydrogen chloride the sulphur sublimes without the formation of any hydrogen sulphide, and pure gold is left.

The existence of a soluble aurous sulphide and a soluble aurous oxide (Krüss, *Untersuchungen über das Atomgewicht des Goldes*, München, 1885) speaks strongly in favor of placing gold in the alkali-group rather than in the platinum-group.

ACIDS FROM DRYING OIL.¹

BY K. HAZURA.

Peters, Dieff, Reformatzky, and the author have on different grounds concluded that the formula of linoleic acid is $C_{18}H_{32}O_2$ and not $C_{16}H_{28}O_2$. In order to set this point at rest, the author has undertaken the present research. When sativic acid is oxidized with alkaline potassium permanganate, the only solid product obtained is azelaic acid.

When linoleic acid is treated with bromine, the hexabromo-compound, $C_{18}H_{30}Br_6O_2$, is the only product. When the tetrabromo-derivative of the acid from hemp oil is treated with excess of bromine, no further bromination takes place, showing that the above-mentioned hexabromo-compound is not derived from this.

The linoleic acid from linseed oil gave an "iodine value" which corresponds with a mixture of two acids, one with the formula $C_{18}H_{32}O_2$, the other with the formula $C_{18}H_{30}O_2$. The formation of a tetra- and hexa-bromo-derivative and of linusic acid and sativic acid on oxidation also support the view that linoleic acid is a mixture. The author prepared the $C_{18}H_{32}O_2$ acid from the tetrabromo-compound and

¹ *Monatsh. Chem.*, 8, 260. Reprinted from *Jour. Chem. Soc.*, October, 1887, p. 913.

the $C_{18}H_{30}O_2$ from the hexabromo-derivative; for the former, he proposes the name *linolic acid*, for the latter *linolenic acid*.

If *linolic acid*, prepared from the tetrabromo-derivative, is oxidized with alkaline potassium permanganate, it yields sativic and azelaic acids, but no linusic acid; when treated with bromine, it gives *tetrabromolinelic acid*, melting at 114–115°.

Linolenic acid, $C_{18}H_{30}O_2$, prepared from the hexabromo-compound melting at 177°, has an "iodine value" of 245, and yields on oxidation no solid acid but linusic acid (m. p. 201°). With bromine, nothing but the *hexabromolinelic acid* is formed.

These experiments clearly show that the acids from drying oils contain both linolic acid, $C_{18}H_{32}O_2$, and linolenic acid $C_{18}H_{30}O_2$. The author proposes to examine the acids from poppy oil, hemp-seed oil, and nut oil, which give only sativic acid on oxidation. He enunciates the following law for the oxidation of the unsaturated fatty acids: these acids when oxidized in alkaline solution with potassium permanganate add as many (OH)-groups as they contain free valencies, and form saturated acids which contain the same number of carbon-atoms in the molecule. On this law, he founds an exact qualitative method for the examination of fats and oils.

TERPENES.

By O. WALLACH.¹

The eight isomeric terpenes may be distinguished from each other by comparing the properties of their compounds with HCl, HBr, HI, etc., as shown in the following table:—

	Pinene.	Camphene.	Limonene.	Dipentene.
$C_{10}H_{16}$ { B. pt.	159–161°	160–161°	175°	180–182°
{ M. pt.	—	48–49°	—	—
$C_{10}H_{16}, HCl$ { B. pt.	207–208°	decomposes	—	—
{ M. pt.	about 125°	—	—	—
$C_{10}H_{16}, HBr$. M. p.	90°	—	—	—
$C_{10}H_{16}, 2HCl$. "	—	—	[50]*	50°
$C_{10}H_{16}, 2HBr$. "	—	—	[64]*	64°
$C_{10}H_{16}, 2HI$. "	—	—	[77 or 73°]*	77° or 79°
$C_{10}H_{16}Br_4$ "	—	—	104–105	125°
$C_{10}H_{16}N_2O_3$ "	—	—	—	—
Color with acetic anhydride and conc. H_2SO_4	pink or yellow	yellowish	red	red

¹ *Annalen*, 239, 1–54. Reprinted from *Jour. Chem. Soc.*, October 1886, p. 965.

*Identical with the corresponding dipentene compounds.

	Sylvestrene.	Terpinolene.	Terpinene.	Phellandrene.
$C_{10}H_{16}$ { B. pt.	175—178°	185—190°	180°	about 170°
{ M. pt.	—	—	—	—
$C_{10}H_{16}, HCl$ { B. pt.	—	—	—	—
{ M. pt.	—	—	—	—
$C_{10}H_{16}, HBr$ M. pt.	—	—	—	—
$C_{10}H_{16}, 2HCl$ “	72°	†	—	—
$C_{10}H_{16}, 2HBr$ “	72°	†	—	—
$C_{10}H_{16}, 2HI$ “	65—72°	†	—	—
$C_{10}H_{16}Br_4$ “	135°	116°	—	—
$C_{10}H_{16}N_2O_3$ “	—	—	155°	94°
Color with acetic anhydride and conc. H_2SO_4	blue	red	red	red

The compounds of the terpenes with two mols. HBr , HI , etc., may be conveniently prepared on the small scale by saturating glacial acetic acid with hydrogen chloride, and adding this solution to the terpene dissolved in acetic acid. When the product is poured into ice-cold water, the compound separates in the pure state.

The bromides are prepared by adding bromine to the terpene diluted with ten times its volume of glacial acetic acid. They are purified by recrystallization from warm ethyl acetate. The hydrochlorides are easily decomposed by boiling with glacial acetic acid and anhydrous sodium acetate, the chief product being the original terpene. If pinene monohydrochloride is treated in this manner at 200° for four hours, it yields camphene. The conversion of pinene into dipentene, terpinolene, and terpinene, has been previously described (see *AMER. JOUR. PHAR.*, 1886, p. 145). Pure pentene and all its derivatives are optically inactive. The dihydriodide, $C_{10}H_{16}2HI$, is deposited from light petroleum in two distinct forms, namely, in rhombic crystals [$a:b:=0.6644:1$], melting at 77°, and in monoclinic crystals [$a:b:c=1.0269:1:0.92619$; $\beta=49^\circ 54'$], melting at 78–79°. Pure dipentene is converted into terpinene by treatment with alcoholic sulphuric, or hydrochloric acid.

Cineol, cajeputol, and eucalyptol are identical. This substance crystallizes when it is cooled in a freezing mixture.

Terpinolene is obtained by boiling terpene hydrate, terpineol, or cineol, with dilute sulphuric or phosphoric acid. The melting point of the freshly prepared tetrabromide is 116°, but old specimens melt at about 112°. At the moment of fusion, a slight evolution of gas is perceptible. Solutions of the tetrabromide are optically inactive.

By the action of hydrochloric, hydrobromic, or hydriodic acids on

†Probably identical with the corresponding dipentene compounds.

terpinolene, the hydrochloride, hydrobromide, etc., of dipentene are formed. Pure sylvestrene hydrochloride is obtained by saturating Swedish oil of turpentine (b. p. 174–178°) diluted with ether with dry hydrogen chloride. After an interval of two days, the ether is distilled off, and the residue is poured into shallow dishes, when the hydrochloride slowly crystallizes out. The operation should be carried out in winter. After recrystallization from warm alcohol, the hydrochloride melts at 72°. It is less soluble in ether and in light petroleum than dipentene hydrochloride. The ethereal solution is powerfully dextrogyrate. Sylvestrene boils at 175–178°; an intense blue coloration is produced by adding a drop of strong sulphuric or nitric acid to a solution of the hydrocarbon in acetic anhydride. Sylvestrene regenerated from the hydrochloride is identical with the hydrocarbon present in Swedish oil of turpentine. It is dextrogyrate.

The hydrochloride, hydrobromide, and tetrabromide crystallize in the monoclinic system.

The hydrochloride forms plates, $a : b : c = 2.0199 : 1 : 2.7641$; $\beta = 76^\circ 32\frac{1}{2}'$.

The hydrobromide also forms plates, $a : b : c = 1.8887 : 1 : 2.6937$; $\beta = 73^\circ 14'$.

For the tetrabromide, $a : b : c = 1.2166 : 1 : 1.6581$; $\beta = 46^\circ 9'$.

Terpinene is obtained by gradually adding 70 cc. of strong sulphuric acid to two litres of oil of turpentine. The mixture is kept cool and is well shaken. After an interval of two days the acid is neutralized with soda, and the terpinene distilled over in a current of steam. Dipentene, phellandrene, and cineol also yield the same hydrocarbon.

Terpinene nitrite, $C_{10}H_{16} \cdot N_2O_3$, is obtained in crystals by adding sodium nitrite in small quantities to a mixture of terpinene, acetic acid, and water. The compound is deposited in the course of two days at the ordinary temperature, or immediately in working on the small scale if the vessel containing the mixture is dipped for an instant into hot water.

The nitrite melts at 155°. It is insoluble in water and light petroleum, but dissolves freely in alcohol, ether and ethyl acetate.

The solutions are optically inactive. The nitrite dissolves in strong hydrochloric, sulphuric and acetic acids, and is reprecipitated unaltered on diluting the acid solutions. On reduction with stannous chloride, the nitrite is converted into a base which has not yet been properly investigated. Terpinin is not converted into camphene or

any other terpene by treatment with alcoholic sulphuric acid, or strong sulphuric acid.

The properties of *phellandrene* have been recently described by Pesci. The aqueous solution is dextrogyrate, but the nitrite is lævogyrate. The nitrite behaves like a saturated compound, and does not destroy the color of bromine-water. Phellandrene has not been obtained in a pure state. It easily changes into dipentene or terpinene derivatives.

NOTES ON SACCHARIN.

BY EDWARD D. GRAYILL, F.C.S., F.R.M.S.

Now that a supply of this reputed substitute for sugar has been placed upon the London market, it will doubtless have attracted the attention of many pharmacists, and as information, having reference to its characters and properties, is as yet somewhat scarce, the following notes may be of interest.

The sample to which these notes refer represents, I believe, a portion of the first supply that has been offered to us as a commercial article, and may therefore be taken to represent the same as it at present occurs in commerce. I think it desirable to call attention to this fact, because of the wide difference I have seen in other samples obtained, I think, by special request some weeks ago, and which do not favorably correspond with the sample under consideration, being much more highly colored, and in comparison having a very strong odor. Saccharin now occurs as a very pale yellow, nearly white, amorphous powder, free from grittiness, but giving a distinct sensation of roughness when rubbed between the fingers. It is not entirely free from odor, but this is very slight, and not at all objectionable, reminding one of a very slight flavor of essential oil of almonds. Its taste is intensely sweet and persistent, which in the raw state is followed by a slight harshness upon the tongue and palate. The sweetness is very distinct when diluted to 1 in 10,000. Under the microscope it presents no definite form of crystallization. A temperature of 100°C., even if continued for some time, has no perceptible effect upon saccharin; it loses no weight, and undergoes no physical change. It fuses at a temperature of from 118° to 120°C., and at 150°C. forms a clear light yellow liquid, which boils a few degrees higher. At the latter temperature dense white fumes appear, and a condensation of tufts of acicular crys-

tals (some well defined) is found upon the cool surface of the apparatus. These crystals, except for a slight sweetness of taste, correspond in characters and tests to benzoic acid. The sweet flavor, I think, may be due to the presence of a very small quantity of undecomposed saccharin, carried mechanically with the fumes. The escaping vapors, which are very irritable, and give a more decided odor of hydride of benzol than the powder itself, also communicate a very distinct sensation of sweetness to the back part of the palate. Heated over the flame, with free access of air, saccharin carbonizes and burns with a dull yellow smoky flame, leaving a residue amounting to 0.65 per cent. of sodium salts. It does not reduce an alkaline copper solution, but, like glycerin, liberates boracic acid from borax, the latter salt dissolving saccharin readily in aqueous solution, due no doubt to a displacement of the boracic acid.

The strong acids, either hot or cold, show no characteristic color reaction; the compound enters solution at the boiling point of the acid, and in the case of hydrochloric, shows a white granular separation on cooling. Sulphuric acid develops an uncharacteristic light-brown color.

The compound, like most of the organic acids, shows a characteristic reaction with ferro- and ferrid-cyanide of potassium. In the former case no change is perceptible until boiled, when a greenish-white turbidity appears with the liberation of small quantities of hydrocyanic acid. In the latter case a trace also of this acid is set free, with the formation of a very distinct green solution, the latter reaction being very perceptible with a few drops of a 1 in 1000 solution of saccharin in water. Heated with lime very distinct odors of benzoic aldehyde are developed.

Saccharin possesses very decided acid properties, and combines very readily with alkalies or alkaline carbonates, forming anhydro-orthosulphamine-benzoates of the same, in the latter case at the expense of the carbonic anhydride, causing strong effervescence. These combinations are very soluble in water, the alkaline carbonate thus forming a ready medium for the solution of this acid, which alone is so sparingly soluble. Another advantage of some importance is, that, while the harshness of flavor perceptible in a simple solution of the acid is destroyed, the great sweetness appears to be distinctly intensified and refined.

The following shows the solubility of saccharin in the various

liquids quoted, all, with the exception of the boiling water, being taken at 60°F.:

Boiling water.....	0.60	parts	per	100	by	volume.
Cold water.....	0.20	"	"	"	"	"
Alcohol '800.....	4.25	"	"	"	"	"
Rectified spirit '838	3.20	"	"	"	"	"
Ether '717.....	1.00	"	"	"	"	"
Chloroform 1.49.....	0.20	"	"	"	"	"
Benzene.....	0.40	"	"	"	"	"
Petroleum ether, insoluble.						

It is also sparingly soluble in glycerin and fixed oils, and to a greater or less extent in volatile oils. Benzoic aldehyde dissolves saccharin in large quantities.

I was somewhat disappointed at the slight solubility of saccharin in ether, as it has been repeatedly stated to be very soluble in that liquid.

The quantity of saccharin required to communicate an agreeable degree of sweetness, like sugar, differs with the material to be sweetened; but from half to one-and-a-half grains, according to taste, will be found sufficient for an ordinary breakfast cup full of tea or coffee infusion.—*Phar. Jour. and Trans.*, October 22, 1887, p. 337.

COMMERCIAL SACCHARIN.

By W. A. H. NAYLOR.

As the characters and properties of this reputed substitute for sugar, described by Mr. Edward D. Gravill, differ in certain important particulars from the results yielded me by a recent examination of Fahlberg's saccharin, I ask permission to place my observations on record.

The sample in question was taken from a stock of ten kilogrammes. It presented the appearance of a white amorphous powder, and when viewed under $\frac{1}{4}$ -inch objective no crystalline structure was discernible. It had a decided odor which to my mind recalled that of myrrh. On the palate it produced a sensation of sweetness which was intense, somewhat sickly, and unpleasantly persistent. Heated in an air-bath it gave a slight sublimate at 110° C., at 172° C. it assumed a pasty condition, but liquefied only when the thermometer registered 197.5° C.

Parenthetically it may be remarked that in a pamphlet issued by the agent for Great Britain it is stated that saccharin fuses at a temperature of about 200° C. A little below 200° white fumes appeared, which condensed into colorless, slender, needle-shaped crystals from

one-eighth to one-quarter inch in length. These were distinctly sweet and contaminated with amorphous matter. In some of their reactions they correspond with benzoic acid, but having failed to obtain them in sufficient quantity and in a state of purity to determine their melting point, I reserve my judgment in respect of their identity. Crystals having similar characters and properties appeared upon heating together an intimate mixture of calcium oxide and saccharin.

Ignited with free access of air my sample gave a residue amounting to not less than 6.67 per cent. It failed to liberate boracic acid from a solution borax either in the cold or on boiling or after being kept over a water-bath for four hours. When introduced into a strong boiling solution of potassium ferrocyanide, green particles immediately separated, which after subsidence were seen to be of the same characteristic color. The decomposition was accompanied by the elimination of hydrocyanic acid. When similarly treated with potassium ferridcyanide a faint odor of hydrocyanic acid was evolved, and the solution, after copious dilution with water, was of an apple-green color.

The method recommended by Schmitt¹ for the detection of saccharin was put to the test, and both its delicacy and accuracy were verified. "It is based on the fact that Fahlberg's saccharin yields sodium salicylate on fusing with sodium hydrate." "The fused mass is dissolved in water and tested for salicylic acid by acidifying with dilute sulphuric acid, shaking with ether, evaporating the latter, and adding a drop of ferric chloride solution to the residue."

The three points which I desire to emphasize on account of their wide divergence from the results already referred to, as published by Mr. Gravill, are the temperature of fusion, the amount of fixed residue, and the non-liberation of boracic acid from a solution of borax. It is pertinent to note that Mr. Gravill is careful to point out that the sample to which his notes refer represents a portion of the first supply offered as a commercial article. He concludes it also represents that which now occurs in commerce. On what hypothesis is this remarkable difference to be explained? Assuming accuracy in their work for both experimenters, which is to be *the* article for the future? and, if variable, will its fluctuations in price correspond with the variations in the proportions of the fixed residue?

Of equal importance to the pharmacist is the question of its pharmaceutical uses. As a flavoring agent for disguising the taste of unpalatable

¹ For abstract, *vide The Analyst*, October, 1887, p. 200.

table mixtures and for toning down concoctions intolerable of exhibition from their bitterness, it will doubtless prove serviceable, but at present the scope of its application must be in general limited to proprietary articles and to medicines prescribed by the physician. To employ it as an adjuvant to official remedies would assuredly not be justifiable.

I can conceive that "the manner in which it lingers on the palate" may prove an objection to its use in cases where the growing tendency has been to exhibit a combination of drugs or their preparations in a *tasteless* form.—*Phar. Jour. and Trans.*, November 5, 1887, p. 377.

CHEMICAL NOTES ON TEA.

By DR. B. H. PAUL AND A. J. COWNLEY.

So far as the chemistry of tea has been studied its most important constituents appear to be an essential oil to which the aroma is due, theine, legumin, and an astringent substance analogous to tannin. With the exception of theine, however, little is known of the chemical characters and relations of these constituents, or of the mode in which the quality of tea is influenced by them. For instance, what is commonly spoken of as the "strength" of tea is a tolerably vague quality in itself, and no relation has yet been ascertained to exist between it and the amount of any particular constituent. Considering the physiological properties of theine it might be supposed that the "strength" of tea depends to a considerable extent upon the amount of this substance, and some probability is given to that opinion by the great variation in the published statements as to the proportions that have been obtained from different kinds of tea. According to the earlier determinations by Mulder, Chinese and Java tea were represented to contain less than one per cent. of theine. Subsequently, Stenhouse found from one to two per cent. in a number of samples examined by him, while Peligot obtained from 2.5 to 4, and in one case as much as 5.84 per cent. of theine. On examining the methods by which these results were obtained they all appear to be open to suspicion of inadequacy to meet, on the one hand, the difficulty of obtaining theine in a sufficiently pure condition, and on the other hand, that of extracting the whole of it in such a condition.

The method of sublimation by which Stenhouse¹ sought to deter-

¹ *Phil. Mag.*, xxiii. (1843), 427.

mine the amount of theine in tea is not capable of furnishing correct results, since the greater part of the theine is decomposed, and this circumstance will account for the low results obtained by him. Peligot's method¹ of treating an aqueous infusion with basic lead acetate, and evaporating the filtrate after separating excess of lead, was equally unsuitable for the determination of theine, since its extraction by water is incomplete, and while the quantity thus obtained cannot be rendered pure by crystallization without loss, there is also a risk of obtaining too high a result if the product is not sufficiently purified before weighing. Consequently the data of both these experimenters cannot be relied upon for accuracy, and the results of some preliminary experiments furnished us with evidence that a further investigation of the subject was desirable. Even Zöller's² more recent examination of a sample of tea from the Himalayas, in which he found 4.94 per cent. of theine, does not sufficiently remove uncertainty as to the amount of theine in average tea, for his memoir suggests that the tea examined by him was of exceptional quality. Moreover, his method of extracting the theine by thoroughly disintegrating the leaves with strong sulphuric acid does not appear well adapted for the purpose. Liebig was of opinion that theobromine was also obtained from the Himalaya tea examined by Zöller, though this point was not settled conclusively, since the quantity of material was too small for the purpose. In two other samples Zöller was unable to find any trace of theobromine. In our analyses of tea we have always endeavored to trace the presence of theobromine, but so far we have in every instance obtained only negative results. It must, however, be mentioned that as the quantity of tea operated upon for the determination of theine is but small, a minute proportion of theobromine might in that case escape detection, and we, therefore, propose to operate upon large quantities to decide this point.

In the course of an inquiry undertaken for the purpose of ascertaining the circumstances that determine the differences of "strength" in tea, one of the points to which we directed our attention was the extraction of the theine in such a way that precise analytical results could be obtained, admitting of a comparison of different kinds of tea in regard to the percentage of theine. After several trials we found that the method we had previously adopted for

¹ *Ann. Chim. Phys.*, [3], xi., 138.

² *Ann. Chem. Pharm.*, clviii, 180; *AMER. JOUR. PHAR.*, 1871, p. 353.

coffee¹ was capable of furnishing satisfactory results, and that with careful manipulation the amount of theine in tea could thus be determined with considerable accuracy.

For this purpose 5 gms. of powdered tea is moistened with hot water, well mixed with 1 gram of hydrate of lime, and the whole dried on a water-bath. The dry residue is then transferred to a small percolating apparatus and extracted with strong alcohol. The clear liquor is to be evaporated to remove alcohol, and the remaining water solution, measuring about 50 cc., mixed with a few drops of dilute sulphuric acid, which separates a trace of lime and partially decolorizes the liquid. After filtering the slightly acid solution, it is transferred to a separator and well shaken with chloroform, which gradually abstracts the theine. This part of the operation requires particular care, for though theine is freely soluble in chloroform it is necessary to shake the acidified water solution with several successive quantities of chloroform in order to remove the whole of the theine. Unless the quantity of theine is very large, about 200 cc. of chloroform will be sufficient for 5 gms. of tea, and that should be used in five or six separate portions, testing the last portions by distilling off the chloroform in a weighed flask until it is found that there is no more theine taken up. The whole of the chloroform solution is then to be placed in a stoppered separator and shaken with a very dilute solution of caustic soda. This will remove a small quantity of coloring matter and render the theine solution quite colorless, so that on distilling off the chloroform from a weighed flask the theine remains in a condition fit for weighing. When the operation is carefully carried out the theine will be perfectly white. In this way we have been able to obtain results of great uniformity.

Our first experiments were made with Indian and Cingalese tea, the general result showing that both kinds contained a much higher percentage of theine than has hitherto been generally supposed, and that the variation in the amount of this substance was not considerable. In this respect, however, there seems to be a marked difference between tea and coffee; the amount of theine in tea is by no means a constant quantity, and so far as the tea of India and Ceylon is concerned it varies from 3.22 to 4.66 per cent. This is taking the tea in the ordinary air dry condition in which it is met with in commerce. The following table gives the results of our determinations in twenty-

¹ *Pharm. Journ.*, [3], xvii, 921; *AMER. JOUR. PHAR.*, 1887, p. 94.

eight samples that were selected for this purpose as representing a wide range of quality, as may be understood from the fact that the prices realized by the corresponding parcels in public sale varied from 7d. to 3s. per pound. The sample No. 10 was tea of exceptionally fine quality, that was valued at 6s. or 7s. per pound, and the sample No. 4 consisted of the hairs detached from the leaves in sifting:—

	Approximate elevation of place of growth.	Moisture per cent.	Theine per cent.	
			Original tea.	Dry tea.
<i>Ceylon Tea.</i>				
	Ft.			
1. Penhros.....	2500	6·8	4·56	4·89
2. F.L.C.....	—	6·0	4·56	4·85
3. Nahalma.....	300	5·6	4·54	4·80
4. Hairs from tea leaves.....	—	6·6	2·40	2·57
5. Hardenhuish Pekoe.....	3500	3·8	4·08	4·24
6. Woodstock Pekoe Souchong.....	4200	3·6	3·44	3·57
7. Radella Broken Pekoe.....	4800	4·6	4·10	4·30
8. Morton Pekoe.....	400	4·2	3·98	4·15
9. Penhros Broken Pekoe.....	2500	6·4	4·64	4·96
10. Strahellie Orange Pekoe.....	2000	5·4	4·10	4·33
11. Nahalma Orange Pekoe.....	300	5·4	4·06	4·29
12. Venture Orange Pekoe.....	4300	5·4	3·74	3·95
13. St. Leys Pekoe Dust.....	4600	5·6	3·46	3·66
14. Venture Pekoe Souchong.....	4300	4·8	3·40	3·57
15. Venture Broken Orange Pekoe.....	4300	6·6	3·98	4·26
16. Calsay Pekoe Souchong.....	5000	6·2	3·22	3·43
17. Venture Pekoe.....	4300	5·6	3·48	3·68
18. St. Clair Orange Pekoe.....	4200	4·6	3·90	4·09
<i>Indian Tea.</i>				
19. Pekoe tips, picked out.....	—	7·56	4·27	4·62
20. Broken Pekoe.....	—	7·00	4·48	4·81
21. Pekoe.....	—	6·40	4·16	4·44
22. Orange Pekoe.....	—	4·80	4·66	4·89
23. Pekoe.....	—	5·60	4·48	4·74
24. Broken Pekoe.....	—	4·80	3·76	3·95
25. Pekoe.....	—	5·40	3·66	3·86
26. "Weak" tea.....	—	6·80	4·06	4·35
27. "Strong" tea.....	—	5·80	4·18	4·43
28. Mixture.....	—	6·00	3·64	3·87

At present we have not had an opportunity of examining many samples of Chinese or Java tea that could be accepted as authentic, but so far as we have been able to judge the amount of theine is less than in the tea of India and Ceylon. We intend, however, to continue the inquiry in that direction as soon as we can obtain suitable samples. But, so far as the tea of India and Ceylon is concerned, it is at least evident from the data above given, as compared with the

prices mentioned, that the marketable value of tea is not to any great extent dependent on or proportionate to the amount of theine it may contain, however important that constituent may be in other respects. Neither can the "strength" of tea, as that term is generally understood, be taken as proportionate to the amount of theine. This is evident from the results of the analysis of the two samples, 26 and 27, which were selected by experienced judges of tea to represent extreme cases of difference as to strength. The amount of theine in 27 is greater than in 26, but to such a small extent that the difference in strength of the tea represented by those samples could not be ascribed to the theine they contain.

It appears to be much more probable that the "strength" of tea is chiefly determined by the amount or condition of the astringent constituent, the precise nature of which is at present only partially known. Moreover, when the mode of preparing tea is considered it is also probable that this quality of "strength" may be largely influenced in degree by the manipulation of the leaves in the process of manufacture, which comprises stages of fermentation and heating in the moist state in contact with atmospheric oxygen, both of which are conditions likely to induce alteration of material analogous to ordinary tannin. But before any definite opinion on this point can be offered in place of the general probability suggested, it will be necessary to acquire a better knowledge of the chemical nature of that constituent of tea leaves which in some respects resembles ordinary tannin.

The commercial value of tea is at present estimated by a combined consideration of several factors, among which appearance counts to a considerable degree. In this respect the size of the leaves, indicating their age, and likewise the presence of what is termed "tip," consisting of the unexpanded leaf buds, serve as indications by which tea is classed partly as Souchong or Pekoe, and partly also as varieties of those kinds of tea. In addition there is also the process of tasting procured by tea brokers. This consists in preparing infusions of the different samples, much in the same manner that tea is commonly used, and then forming a judgment as to the value of the samples according to the aroma, flavor and other characteristics of the corresponding infusions. This is an art that is practised with a surprising degree of precision, so that the results arrived at by different operators agree in a very remarkable manner. In carrying out the broker's test, tea is infused for five minutes in boiling water in the proportion

of about 43 grains to $3\frac{1}{2}$ fluid ounces of water. The infusion is then poured off from the leaves into a cup and the value of the tea estimated by its taste. In this operation the soluble constituents of the leaves are only partially extracted, and while more perfect exhaustion of the leaves, will give about 35 per cent. of extract, the amount taken out in the ordinary broker's method of testing does not amount to more than 20 per cent. on the average. Hence it is evident that attempts to value tea on the basis of the total amount of extract obtainable by treatment with boiling water must be entirely fallacious and useless for any practical purpose. In respect to the amounts of extract thus obtainable from tea of different qualities, there is not in reality any such difference as would afford indications of the actual differences in value. Peligot and others have made determinations of this kind, showing that different kinds of black tea yield from 24 to 47 per cent. of extract, or on the average 34 to 40 per cent., but these data have little practical value. It is indeed not by the perfect extraction of tea that its value can be estimated. This must be sought for within the limits of extraction which obtain in the ordinary methods of using tea, as is the case in the broker's method of testing, which fairly represents ordinary practice in the use of tea, though the infusion is then made stronger than it is generally drunk.

To obtain some idea of the extent to which the constituents of tea are extracted under these ordinary conditions we have made analyses of the infusion thus prepared, and have ascertained as a general result that the 20 per cent. of extract taken out by the infusion will contain about one-half of the theine present in the tea used. An ordinary breakfast cup of equally strong tea infusion, measuring about eight ounces, would therefore contain two grains of theine, or thereabouts. The rest of the theine is left in the spent leaves, and it requires repeated treatment with boiling water to extract the whole quantity. This is no doubt one of the reasons why the amount of theine in tea has been underestimated in so many instances, since experimenters have operated upon a water extract for its determination. In one instance we found that the residual leaves of tea which had been used in the customary manner contained as much as 1.7 per cent. of theine, and in another case leaves exhausted as far as practicable by percolating with boiling water still contained as much as 0.13 per cent. calculated on the original tea.—*Phar. Jour. and Trans.*, November 19, pp. 417-419.

SYNTHESIS OF PILOCARPINE.¹

BY HARDY AND CALMELS.

The synthesis of pilocarpine was effected by converting β -pyridine- α -lactic acid into pilocarpidine, which was then transformed into pilocarpine by oxidation.

One gram β -pyridine- α -lactic acid was mixed with 100 grams of carbon bisulphide and 10 grams of phosphorous bromide and distilled to dryness. The residue was extracted with water, the solution neutralized with baryta, the excess of baryta removed by means of carbonic anhydride, and the solution evaporated to dryness at a temperature not exceeding 60°. The residue thus obtained was purified by repeated treatment with alcohol, and then mixed with hydrobromic acid and auric chloride, when crimson plates of the normal aurobromide of β -pyridine- α -bromopropionic acid are obtained. The gold is removed by means of hydrogen sulphide, and the free acid is heated in sealed tubes at 150° for several hours with excess of triethylamine. The product is treated with an aqueous solution of potassium carbonate, and the oily drops of the liberated alkaloid are dissolved in ether alcohol, and purified by treatment with animal charcoal. When mixed with auric chloride, it yields the modified aurochloride of pilocarpidine, $\text{AuCl}_3 \cdot \text{C}_{10}\text{H}_{14}\text{N}_2\text{O}_2$, melting at 144°.

In order to convert pilocarpidine into pilocarpine, the extra-pyridic nitrogen of the former must be rendered pentavalent by the addition of a methyl-group, whilst the pyridic nitrogen remains trivalent.

When pilocarpidine is mixed with methyl iodide in alcoholic solution at 60–100°, it combines with 1 mol. of methyl iodide, forming a compound which crystallizes with difficulty. If this compound is mixed with auric chloride an oily precipitate is formed and gradually changes to large prismatic needles which melt at 152–153°, and have the composition $\text{AuCl}_4\text{Me} \cdot \text{C}_{10}\text{H}_{14}\text{N}_2\text{O}_2$. This compound readily loses methyl chloride when fused, and yields modified pilocarpidine aurochloride, melting at 144°. Pilocarpidine mixed with excess of methyl iodide in concentrated methylic solution, and then with fragments of solid potassium hydroxide, care being taken that the temperature does not rise too high, combines with methyl iodide (1), and methyl hydroxide (2), and if this product is treated with carbonic anhydride,

¹ *Compt. rend.*, 105, 68–71. Reprinted from *Jour. Chem. Soc.*, November, 1887.

and the liberated alcohol removed, a methiodide is obtained identical with that formed by the action of methyl iodide on pilocarpidine at 60° . The hydroxymethylpilocarpidine obtained by the action of silver oxide on the corresponding methiodide, yields pilocarpidine when boiled with water. These results show that it is difficult if not impossible to remove the methyl hydroxide from position (1), and replace it by methyl hydroxide in position (2).

When, however, pilocarpidine methiodide is oxidized by means of silver permanganate, an unstable group, $\text{MeN}^{(O)}\text{MnO}_4$, is formed, and decomposes without affecting the remainder of the molecule. An aqueous solution of pilocarpidine methiodide is mixed with silver permanganate until the greater part of the silver iodide is precipitated. Oxidation takes place immediately, and the liquid contains pilocarpine and formic acid. The alkaloïd is liberated by addition of potassium carbonate, and yields the aurochloride $\text{AuCl}_3 \cdot \text{C}_{11}\text{H}_{16}\text{NO}_2$, melting at 88° . Synthetical pilocarpidine and pilocarpine yield gummy derivatives similar to those obtained by Harnack and Meyer from the natural products. This phenomenon is confined to the gold compounds, and is purely physical.

The physiological action of synthetical pilocarpine is identical with that of the natural alkaloïd.

MANUFACTURE OF α -NAPHTHYLAMINE.¹

BY O. N. WITT.

An important feature in the success attending the manufacture of naphthylamine is the purity of the naphthalene employed. The nitration is effected in cast-iron cylinders fitted with stirrers and cooling jacket. The charge consists of 250 kilos. of naphthalene, 200 kilos. of nitric acid of 40° Baumé, 200 kilos. of sulphuric acid of 66° Baumé, and 600 kilos. of the waste acid from a previous nitration, the latter being used as diluent. The nitration is performed at 45 – 50° , the temperature being regulated by the rate at which the naphthalene is added and the flow of cold water through the cooling jacket. The reaction is completed in about 12 hours. The contents of the apparatus are then transferred to wooden vats lined with lead and allowed to

¹ *Ding. polyt. Jour.*, vol. 265, pp. 225–230; reprinted from *Jour. Chem. Soc.* November.

cool. The waste acid is run off and the nitronaphthalene boiled out with water until free from acid. It is then reduced in apparatus similar in construction to those employed in the manufacture of aniline. For this purpose, 600 kilos. of air-dried nitronaphthalene are added gradually to a mixture of 800 kilos. of iron borings and 40 kilos. of hydrochloric acid, the temperature being regulated by the introduction of the nitro-product, so that it is about 50°. When all the nitronaphthalene has been put in, the operation is continued for 6–8 hours, the temperature being kept at 50°. At the end of the reduction, milk of lime is stirred into the mass, and the contents are transferred to shallow iron trays, and distilled in retorts constructed to carry several tiers of trays. The distillation is assisted by the introduction of super-heated steam. A black oil is obtained which solidifies on cooling. The crude product is purified by rectification in wrought-iron stills which are heated directly by the fire. Naphthylamine comes over as an almost colorless oil, which is poured into moulds to solidify, when it forms crystalline cakes which are light-gray, or nearly white.

The author is of opinion that the reduction of nitronaphthalene is effected essentially by ferrous chloride, which during the reaction is converted into a basic chloride, possibly $\text{Fe}_2\text{Cl}_4\text{O}$, according to the following equation: $-24\text{FeCl}_2 + 4\text{C}_{10}\text{H}_7\text{NO}_2 + 4\text{H}_2\text{O} = 12\text{Fe}_2\text{Cl}_4\text{O} + 4\text{C}_{10}\text{H}_7\text{NH}_2$. The basic compound is then attacked by the excess of iron, and reduced to ferrous chloride with formation of ferrosoferric oxide, thus: $12\text{Fe}_2\text{Cl}_4\text{O} + 9\text{Fe} = 3\text{Fe}_3\text{O}_4 + 24\text{FeCl}_2$. The ferrous chloride then acts on a further portion of nitronaphthalene.

As commercial naphthylamine is frequently supposed to contain small quantities of beta-compound, the author has made a series of experiments, the results of which showed that no trace of β -naphthylamine is formed. The author has, however, detected the presence of a base in crude naphthylamine, which, judging from its properties, seems to be *paranaphthylenediamine*.

Iodoform in Heart Disease.—About a grain in four pills, one to be taken every two hours, has rapidly dissipated the functional derangements dependent on valvular disease. The experimental results obtained in dogs completely demonstrate that iodoform retards cardiac contraction.—*Amer. Pract. and News*.

VARIETIES.

Phosphorus and its Administration.—Soltmann condemns all aqueous preparations of phosphorus, and recommends the oily preparations, and especially an oily solution of 1 to 500. In its preparation three grains of phosphorus are dissolved in three and one-eighth ounces of oil of almonds over a water bath; when the phosphorus has been previously thoroughly dried and the process is carefully conducted, the phosphorus is never deposited. The physician may order as follows:

R.—Phosphori..... gr. $\frac{1}{2}$
Ol. morrhue..... \mathfrak{z} $3\frac{1}{8}$

M.

Sig.—Daily one teaspoonful, which may be conveniently dispensed by adding five grammes (\mathfrak{z} $1\frac{1}{4}$) of the almond oil solution of phosphorus to ninety-five grammes (about three ounces) of cod-liver oil.—*Therapeutische Monatshefte*; *Med. News*.

Dr. E. R. Squibb recommended a solution of phosphorus, one part, in cod-liver oil, 99 parts, in Proceedings of the American Pharmaceutical Association, 1876, p. 474.

Iodide of Mercury and Morphine.—Herding (*Pharm. Zeitg.*) calls attention to the danger of prescribing morphine and iodide of mercury at the same time, on account of the formation of a double iodide of the two bases, which is highly poisonous.—*N. Y. Med. Jour.*, July 23.

MINUTES OF PHARMACEUTICAL MEETING.

PHILADELPHIA, November 15th, 1887.

The second of the present series of Pharmaceutical Meetings was held this day, Mr. Wm. B. Webb presiding. The VIIIth vol. of the Index to the Library of the Surgeon-General's office was presented to the library.

The Registrar presented on behalf of Messrs. R. Shoemaker & Co., samples of ten spices in their natural condition, and also powdered, all neatly packed in salt-mouth bottles.

Messrs. W. R. Warner & Co., of this city, also presented seventy-two samples of sugar-coated pills, and thirty samples of granules, and a large globe of tablets of compressed chlorate of potassium.

Mr. W. B. Burk presented a very fine collection of sponges, in their condition when just taken from the water, and also in their usual appearance in commerce.

The Registrar was directed to return the thanks of the College for the various donations received.

Professor Maisch read a paper upon *Sodium fluosilicate*, and its use as an antiseptic, by Mr. Frank H. Rosengarten.

Mr. Webb inquired whether *boroglyceride* still held as high a place as an antiseptic as when first announced. In reply, Prof. Remington stated that what was called unfermented wine was preserved by its agency, and that at least one per cent. boric acid was necessary for this purpose.

Mr. Jos. England asked whether the antiseptic power was not in proportion to the solubility of the preservative; this was answered by the statement that antiseptics and antiferments were dissolved when used for liquids.

Prof. Remington stated that *corrosive chloride of mercury* was generally considered the most efficient antiseptic, while of late *potassio-mercuric-iodide* has been praised very greatly; these substances are so strongly poisonous that their free use is not unattended with danger. The *Britannic*—the steamer in which some cases of cholera appeared on her recent voyage—had been fumigated and disinfected with solution of mercuric chloride; this treatment would render the steamer quite undesirable as a passenger vessel.

Mr. Rosengarten said that in cryolite we had a source of fluosilicate of sodium adequate to any demand, and if prepared on a large scale it could be produced at quite low figures.

Mr. Robert England said that he had noticed where unfermented wine had been used, it had produced symptoms of disordered stomach, which he thought due to the boroglyceride used in preserving the wine.

Mr. Stewart Culin was introduced to the meeting, and read a very interesting paper upon the *Chinese Drug Stores in America*. The paper was accompanied with samples of various drugs prepared for use, and with pills of various sizes protected with coatings of vegetable wax; the instruments with which the work of the store was accomplished were exhibited. Some of these remedies were intended to cure sick people, while others were given with the design of keeping the customers from becoming sick. The meeting was much pleased with the paper and passed a vote of thanks to Mr. Culin for the trouble he had taken in presenting so interesting a paper.

A paper upon *Fluid Extract of Burdock* was read by Mr. E. C. Leshner, the results having been reached by experiments made in the pharmaceutical laboratory of the college. Prof. Remington stated that there were other students engaged in similar work in the laboratory, and that more information of this character might be expected from the same department.

Mr. Clark, of the present senior class, read a paper upon the *Comparative Value of Vegetable and Animal Glycerins*. The summary of this paper was that the glycerins were about equal in quality, and yet the price of that from vegetable oils is considerably higher. To the inquiry whether glycerin obtained from cotton-seed oil was used in the arts now, the reply was that the vegetable glycerin reported on was made by Procter & Gamble Co., of Cincinnati, and was so considered; but that there was no authority given by the makers for such a statement.

Mr. Clark also read a paper upon *Wood Alcohol*, a product of greatly increased interest within the last few years, as a substitute for ethylic alcohol, its price being much lower; it should also be noted that it is a solvent for gum shellac of much greater power than ethylic alcohol.

Mr. Joseph W. England read a paper upon *Powdered Camphor*, and presented specimens prepared both by the usual and new way.

Mr. Moerk read a paper upon *Linseed Oil*, giving results of tests made with oil obtained in different ways.

The papers read were referred to the Committee on Publication.

There being no further business a motion to adjourn was made and carried.

T. S. WIEGAND, Registrar.

PROCEEDINGS OF STATE PHARMACEUTICAL ASSOCIATIONS.

Georgia, pp. 32.—(See June number, p. 315). Next meeting in Atlanta, July 10th, 1888; Wm. S. Parks, Local Secretary.

Michigan, pp. 288.—The meeting was held at Petroskey, July 12 to 14. Among the papers read at this meeting were the following: "Use of the Microscope," by Louisa R. Stowell; "Volumetric Estimation of Phosphoric Acid," by B. W. Cheever and E. R. Beal; "Alkaloidal Strength of Ipecac," by H. W. Snow; "Commercial Citrate of Iron and Quinine," by E. C. Federer; "Spirit of Nitrous Ether," by G. B. Topping; "Analysis of the Water of Lake Superior," by W. F. Jackman; "Disinfectant and Antiseptic Preparations," by A. S. Mitchell; "Kerner's Test," by E. A. Ruddiman; "Color of Tincture of Opium," by J. O. Schlotterbeck; "Opium Assays," by C. D. Wiley; "Bibliography of Opium Assay," by A. Van Zwaluwenberg; "Instruction of Apprentices," by O. Eberbach; "Cocaine and Hygrine," by F. G. Novy; "Estimation of Glycerin in Fluid Extracts," by A. J. Baumhardt; "Pharmaceutical Literature," by Geo. McDonald; "Formulas of the Dispensatories," by A. B. Lyons. The next meeting was to be held in Detroit, October 9, 1888, but the time will probably be changed to September. Mr. Jas. Vernor, is local secretary.

Ohio, pp. 193.—(See July number p. 372). Next meeting at Columbus, June 12, 1888; H. C. Cook, Assistant Secretary.

Wisconsin, pp. 96.—The meeting was held at Milwaukee, August 9 to 11. Among the papers read the following may be mentioned: "Purity of Commercial Essential Oils," by C. H. Bernhard; "Saccharolé of Cinchona," by Prof. F. B. Power; "Pharmacopœial Syrups," by H. T. Eberle. The next meeting will be held at Palmyra, August 7, 1888; C. F. Yates, local secretary.

California Pharmaceutical Society.—The Eleventh Annual meeting was held in San Francisco, November 10. The annual reports of president, secretary and librarian were read, and various routine business was transacted. The officers elected are Fred. C. Keil, president; Professors Behr and Wenzell, vice-presidents; Henry Michaels, treasurer; Chas. M. Troppmann, secretary; Josephine Barbat, librarian, and Prof. Wenzell, editor. Propositions were made to reduce the annual dues, and for holding a meeting in an interior town in May next. Messrs. Dawson, Runyon and Calvert were appointed a Committee to solicit members for the American Pharmaceutical Association.

The published Proceedings of this Society for the years 1885 and 1886, which contain also the commencement exercises of the California College of Pharmacy, make a pamphlet of eighty-six pages.

The *California College of Pharmacy* held its fifteenth annual commencement exercises at Odd Fellows' Hall, in San Francisco, November 8, when fourteen candidates received the Degree of Graduate in Pharmacy. Valedictory addresses were made by Prof. Behr and by H. W. Crew, Ph.G., and the following prizes were awarded: Gold medal to M. H. Logan; microscope

to John C. Ing, Jr., and lecture tickets for the senior course to the junior student, R. T. Frank. During the last session of the college fifty students had matriculated as juniors, and twenty-seven as seniors.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Text Book of Therapeutics and Materia Medica, intended for the use of students and practitioners. By Robert F. Edes, A.B., M. D., etc. Philadelphia: Lea Brothers & Co., 1887. 8vo, pp. 552. Price, in cloth, \$3.50; in leather, \$4.50.

This work is intended to be of practical usefulness, and we believe that it will fulfill its mission. The action and uses of the different drugs are given in a clear and comprehensive manner without going into tedious details, and avoiding theoretical speculations which have only a remote bearing on the truly therapeutic action of drugs.

The consideration of the drugs is preceded by brief chapters on prescriptions and incompatibles, preparations and excipients, absorption and elimination and classification. The grouping of the drugs is based mainly on therapeutic action without losing sight of their chemical nature or physiological effects; the repetitions that did become necessary by this arrangement are pointed out not only in the index, but by cross references, also in the text. The groups are twenty-five in number, and several of these are subdivided.

Descriptions of crude drugs are very properly omitted, and the proximate constituents are mentioned mainly in so far as they are of importance on account of the medicinal effects. The chemicals are very briefly characterized as to their physical appearance, their solubility in different menstrua, and their chief incompatibles. Recently introduced compounds are likewise considered as far as their probable importance seemed to require; thus we find references to iodol, lanolin, salol, antifebrin, antipyrine, etc.

A table of poisons with their antidotes, a therapeutic index and a general index of subjects complete the work. The make-up is quite attractive, and by the use of different types the pharmacopœial and extra-pharmacopœial drugs are readily distinguished, as well as the more or less important parts of the text.

A Laboratory Manual of Chemistry, medical and pharmaceutical, containing experiments and practical lessons in inorganic synthetical work; formulæ for over three hundred preparations, with explanatory notes; examples in quantitative determinations and the valuation of drugs; and short systematic courses in qualitative analysis and in the examination of urine. By Oscar Oldberg, Pharm. D., Professor of Pharmacy and Director of the Pharmaceutical Laboratories in the Illinois College of Pharmacy, Northwestern University; and John H. Long, Sc. D., Professor of Chemistry and Director of the Chemical Laboratories in the Medical College and the Illinois College of Pharmacy, Northwestern University. With original illustrations. Chicago: W. T. Keener. 8vo. pp. 435.

Of the three parts into which this work is divided, the first treats of the elements and their compounds, and outlines a number of experiments designed to illustrate the characters, chemical and physical, of the non-metals, while

for the metals the characteristic reactions of their compounds are mainly given. Part II, entitled *Synthetical Chemistry*, gives directions for preparing inorganic and organic compounds, both arranged in such a manner, that the acid is first considered, followed by its alkali compounds and concluding with the salts of the heavy metals. Part III is devoted to analytical chemistry, explaining the method for separating and recognizing the metals when in water soluble compounds; then giving the tests for the recognition of the acids, the treatment of insoluble compounds, and of metals and their alloys. Chapters on volumetric analysis, on the determination of sugar, alcohol, tannin, the commoner alkaloids, etc., and on the examination of urine conclude the text proper. Preceding the index is an appendix of fourteen pages, containing directions for preparing test liquids, determining specific gravities, and tables of thermometric scales, weights and measures, solubilities, etc. Five plates, each with six figures, and accompanied by explanatory text, illustrate the microscopic appearance of constituents, deposits and contents of urine, likely to be met with in urinalysis. About twenty-five illustrations of apparatus are contained in the text of the work in explanation of experiments and processes.

The arrangement of the material, it will be observed, differs essentially, from the one more commonly followed, and which we have always found to be satisfactory and instructive. The characteristics of the inorganic salts are well impressed upon the mind by studying those of the same metal together; but it must be acknowledged that as arranged in the work before us, the plan is not confined to the organic acids alone, as is usually the case, but is uniform throughout. The descriptions given are brief and exact; the directions are clear and devoid of needless detail; and the examples are well selected. But it appears to us that those examples relating to strictly pharmaceutical preparations, might have been preferably embodied in a separate volume; we refer to preparations like sulphurated oil, phosphorated oil, the various solutions of iodine, spirits, glycerites, syrups, etc. For analytical work the use of suitably prepared tables has been found to be very instructive, and they are embodied in most works intended to be used in the laboratory.

The work has evidently been intended for use both in the chemical and pharmaceutical laboratory, and in both will be found useful. The numerous tables of formulas, molecular weight, percentage composition and specific gravities which have been added to the different elements and their compounds are not only of interest, but they are instructive and of practical usefulness. The display of types is judicious, and the typography and outward appearance of the book are commendable.

Pharmaceutical Problems and Exercises in Metrology, Chemistry, Pharmacy and Pharmaceutical Nomenclature.—By Oscar Oldberg, Phar. D., etc. Chicago: W. T. Keener, 1887. 12mo. pp. 75.

This is a companion to the preceding work, and is mainly devoted to stoichiometric exercises, a subject to which, in many cases, not sufficient attention is paid. The exercises all relate to laboratory work, except those of Part IX on pharmaceutical nomenclature, which are really philological exercises, doubtless of great value to a large number of students.

Methods of Analysis of Commercial Fertilizers, Feeding Stuffs and Dairy Products, adopted at the fourth annual Convention of the Association of Official Agricultural Chemists, August 16-18, 1887. Edited by Clifford Richardson, Secretary. Washington: Government Printing Office. 8vo. pp. 80.

This pamphlet is issued by the U. S. Department of Agriculture, Division of Chemistry, as Bulletin No. 16.

The reception of the following pamphlets is acknowledged :

Supra-pubic Lithotomy; A Historical Sketch. By Ch. W. Dulles, M. D., etc. pp. 8. —Reprint from the Transactions of the Medical Society of the State of Pennsylvania, for 1887.

The Position which Chemistry Occupies in Itself and in Its Relation to Medicine. By Prof. W. Simon, M.D., Ph.D.—Reprint from the Maryland Medical Journal, Oct. 22, 1887.

Report of the Committee appointed October 21, 1887, to examine into the scientific value of Volapük. Presented to the American Philosophical Society, November, 1887.

Fifteenth and Sixteenth Annual Reports of the Alumni Association of the College of Pharmacy of the City of New York, 1886 and 1887. 8vo. pp. 116.

The pamphlet contains the commencement exercises of the College, the minutes of the meetings of the Alumni Association, the reports of the officers, various addresses, lists of graduates, etc.

OBITUARY.

Gustav Robert Kirchhoff died in Berlin, October 17th. He was born in Königsberg, March 12th, 1824, and studied physics and mathematics at the university of his native city, where he graduated in 1846. In 1848 he was attached to the University of Berlin, as private lecturer on Mathematical Physics. In 1854 he was called to the University of Breslau as Professor extraordinary of Experimental Physics; in 1854 he accepted a call to Heidelberg as Professor of Natural Philosophy and Director of the Physical Institute; and in 1875 he went in a similar capacity to the University of Berlin. He made a large number of laborious and important investigations on electricity, galvanism, light, elasticity and other branches of physics, and, while thus engaged, published in 1861 his work on The Physical Constitution of the Sun and the Spectra of the Chemical Elements. These researches extended the previous observations of Fraunhofer, Talbot, Whetstone, Foucault, Angström, Swan and others, and led to that analytical method known as spectrum analysis, which was elaborated by Kirchhoff conjointly with Robert Bunsen, who, since 1852, is Professor of Chemistry at the University of Heidelberg. Their joint researches were published in 1860 and 1861, together with the announcement of the discovery by them of two new metals—caesium and rubidium.

Herman A. Vogelbach, of Philadelphia, died at Green Cove Springs, Florida, November 15th. He graduated from the Philadelphia College of Pharmacy in 1860, and was in business for a number of years in the upper part of the city. Some years ago he went to Florida, and at the time of his death, was in the drug business in Melrose, Fla.

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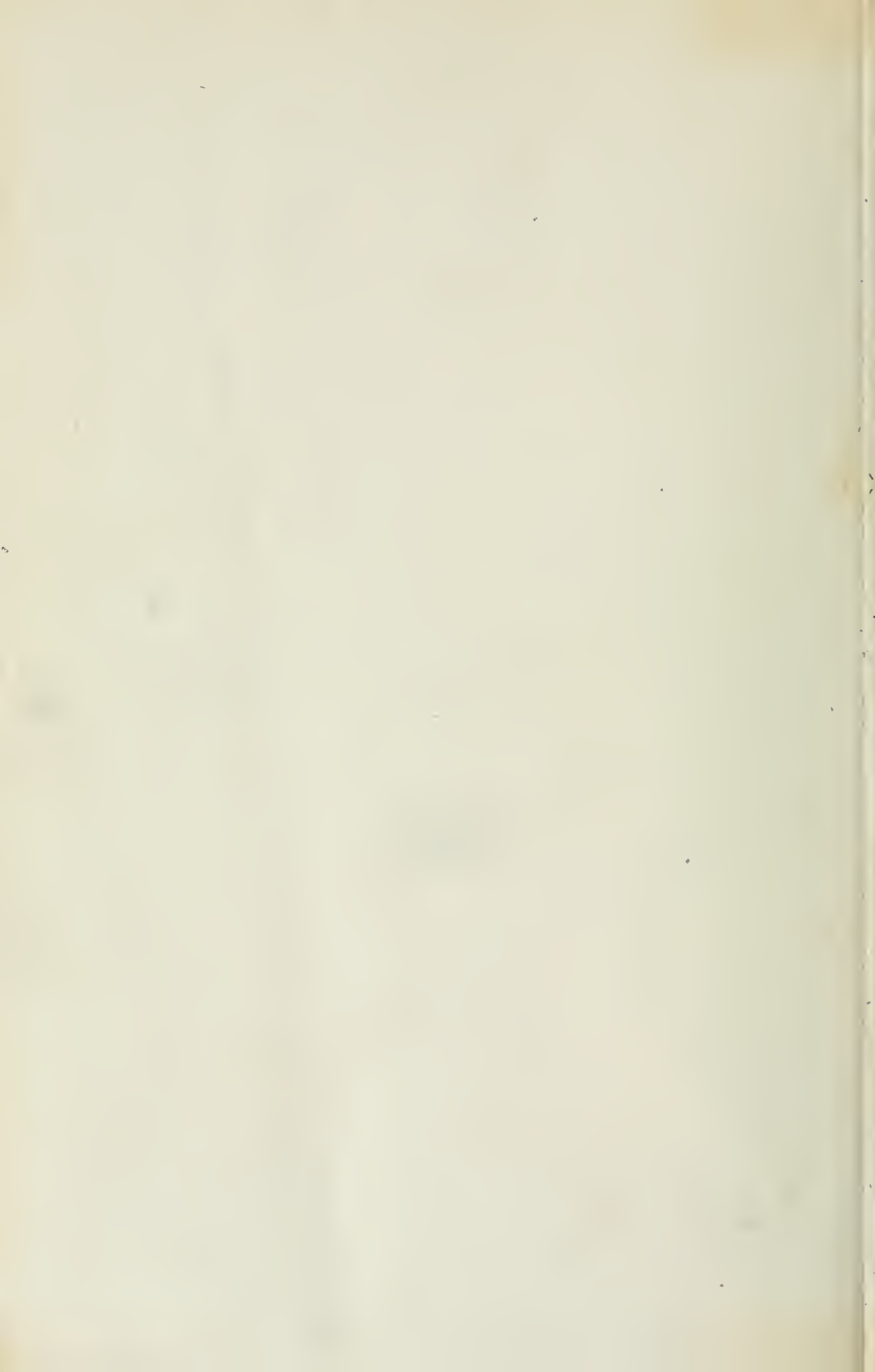
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American Journal of Pharmacy vol 59 (1897)

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